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[OFFICIAL NOTICE.]

Fourth Annual Meeting, Canadian Gas Association.

CANADIAN GAS ASSOCIATION,
OFFICE OF THE SECRETARY,
HAMILTON, ONT., June 1st. 1911.

The Canadian Gas Association will hold its Fourth Annual Meeting in the City Hall, Quebec, on Thursday, Friday and Saturday, 15th, 16th and 17th, June.

The President, Mr. Arthur Hewitt, General Manager, Consumers Gas Company, Toronto, will call the meeting to order at 10 A.M., on Thursday. After the Minutes, Executive Committee Report, and the Secretary-Treasurer's Report, etc., have been disposed of, the President will address the meeting. Thereafter the following papers will be read and discussed:

"Increasing the Efficiency of a Water Gas Plant," by Mr. J. S. Haug, Montreal Light, Heat and Power Company.

"What We Are Doing to Meet Our Latest Competitor," by Mr. W. J. Alston, Manager, Gas Appliance Company, London.

"Calorific *vs.* Candle Power Standards for City Gas: Should There be Two Standards or Only One?" by Mr. W. C. Philpotts, Chemist, Consumers Gas Company, Toronto.

"Operating Water Gas Sets," by Mr. R. A. Wallace, Quebec Light, Heat and Power Company.

"Merit or Points System as a Basis for the Remuneration of Commercial Representatives," by Mr. W. Kennedy, Commercial Department, Consumers Gas Company, Toronto.

Elaborate arrangements have been made for the entertainment of the members and friends by the Entertainment Committee, of which Mr. R. A. Wallace, Quebec, is Chairman.

On Thursday afternoon there will be an observation car tour through the city of Quebec. A visit will be made to the C. P. R. Atlantic Steamship, "Empress of Britain." In the evening the Band of the Quebec Cadets Corps will give a band concert on the Terrace by special arrangement.

On Friday a special car will be run to the famous shrine of St. Anne de Beaupre, stopping on the return trip at Montmorency Falls, where the guests will be entertained at dinner by the Quebec Railway, Light, Heat and Power Company. Dancing will be enjoyed in the evening.

On Saturday a visit will be made to the historic plains of Abraham and other places of interest.

JOHN KEILLOR, Secretary.

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PUBLISHERS' ANNOUNCEMENT.

After a half century of continued use, and owing to the frequency with which requests have been made by many of our subscribers, and several advertisers as well, for a change in the make-up and dress of the JOURNAL, it has been determined to alter these forms. Beginning with our number, to bear date of July 3d, which date marks the commencement of our fifty-third year of publication, the JOURNAL will appear between covers. Further, the reading matter will be centered in the book. The determination was reached mainly on the ground that those who bind their numbers at the end of each half year—and it is a certainty that well over 50 per cent. of our readers

follow that practice—will not have such great bulk to deal with as now, under the practice which virtually obliges them to bind in a considerable portion of the advertising matter. It is the pleasant task of the publishers to say that the standing of the JOURNAL, from every point of view, never was better, and we know that its appearance each Monday morning of the year, at the receiving points of its subscribers, is welcomed. In the future, as in the past, the JOURNAL will continue to do its best in safeguarding the best interests of an industry, that within a century has gone from last place to a close first in the annals of the world's trading.—A. M. CALLENDER & CO.

BRIEFLY TOLD.

PUBLIC SERVICE COMMISSIONS.—One more or less prominent feature of agitation concerning the establishment of public service commissions has to do with the existing affiliation of those eligible for appointment on such commissions. In some States the intention seems to favor debarring anyone who is directly or indirectly interested in any of the utilities under the Commission's jurisdiction, or in the bonds, stocks, securities, etc., thereof. The Railroad Commission of Washington, organized under a law containing the above requirements, states in its fifth annual report, 1910, that this law of necessity practically prohibits any member of the Commission from having had previous actual experience in railroad affairs. Such inexperience necessitated a preliminary investigation preceding actual work, which occupied practically the first year of the Commission's existence. This preliminary investigation involved a careful study of the general principles underlying proper rate making, the rules governing and pertaining to operation of railroads, the methods controlling the accounting system of the roads, the facts pertaining to operating revenue and expenses, the work done by the principal railroad commissions of the United States; and, in addition, a study and comparison of the railroad laws of the various States, together with the decisions of the courts interpreting such laws. It can be readily seen from this that no public service body could hope to begin work with any degree of popularity, since a negative situation is one nearly as harmful to business conditions as those of a real panic. However, aside from such fact, is it at all probable that a man can acquire, in a year's time, the knowledge requisite to regulate the business of large interests employing thousands of men and involving great sums of money?

A "PRETTY" BALANCE SHEET.—The shareholders of that surely going concern, Messrs. J. T. White & Co., of this city, are to be congratulated over the "Balance Sheet" submitted to them some days ago. We introduce it as a "pretty" one; and so it is in every best sense of that often misused member of the English language. For, to begin with, it is a model of the "art printorial," and, in the second place, it clearly and tersely tells to what pretty good extent the Company's operations were carried on during its last fiscal year, which came to an end the last day of last winter. An increase of well over 19 per cent. in the surplus is certainly pretty good work, and a decrease in deferred charges, amounting to 25 per cent., is even prettier work. And, then, there is this comforting knowledge to absorb: "Nearly all of the properties in which your Company is interested have shown during the past year substantial and satisfactory increases in earnings, and some of them have also increased their dividend rates, so that the income from securities owned is gradually and substantially advancing."

CURRENT MENTION—

DEPUTY UNITED STATES MARSHALL THOMAS MARTIE offered for public sale, under the terms of the court decree, on the afternoon of the 2d inst., the properties of the old Mahanoy City (Pa.) Gas Company. The property was sold to the Messrs. Geist, of Philadelphia, at their bid of $500. The sale was in effect an arrangement for perfecting title.

ADVICES from Milwaukee, Wis, dated the 5th inst., are to this effect: "Late last week final legislative action was given to the measure which repeals the exclusive franchise privilege heretofore enjoyed by the Milwaukee Gas Light Company for over 50 years. The Senate concurred in the Assembly measure originating the legislation. It may be that Governor McGovern will not sign the measure, in that it is quite in opposition to some of his publicly expressed utterances concerning reckless abrogation of binding contracts; but, on the other hand, the Governor will find a loophole for an affirmation by holding that the Company can still retain Milwaukee proper as exclusive territory through securing the grant which follows that doleful sounding appellation, 'indeterminate permit.' In the event of sailing into that doubtful haven, the Company moors to a plank which permits the city to take over its plant for operation on municipal account.

"B. V. T." writes us that the usual outing of the employees of the New Haven (Conn.) Gas Light Company will be brought off this year in the "South End" district the afternoon of Saturday, the 17th. The main attraction will be a game of baseball between the fitting division men and those in the collection, business and bookkeeping divisions. Some have the temerity to say that Mr. Wyant could be induced to "make a book" on the result! Dinner will be served at 5:30, and during the gastronomic delights those famous musicians, Messrs. Skinner and Buschman, will oblige with vocal numbers, also with blasts from the cornet. The yeomen in the breach (otherwise the committee-in-charge) is composed of Messrs. R. Blackie, Wm. Saunders, Wm. Mills, Thos. Mehan and C. F. Hine.

THE properties of the Waco Citizens Street Railway and the Waco Gas and Electric Company, Waco, Tex., have been purchased by the Southern Traction Company.

THE Carlisle Gas Company, of Carlisle, Sullivan county, Ind., has been organized to manufacture and distribute artificial gas in the district named. Its Directors are Messrs. H. T. Munbaugh, W. F. Dodge, J. G. Frazee, Joseph Hume, E. W. Rogers, J. F. Sproull and C. B. Willis.

MR. J. H. SMALL has resigned from the Secretaryship of the York (Pa.) Gas Company. This resignation is said to mean a complete reorganization of the corporation at a later time.

PROPERTY owners on Huffman avenue, Dayton, O., are protesting to the local authorities against a new method of procedure which is being followed by the Dayton Gas Company in respect of putting down service pipes. The residents claim that heretofore the Dayton Gas Company bore the cost of service connections from the main to the curb line. The Company is now demanding, or at least asking, the property owners to sign agreements to bear the cost of the service connections to the curb line, with the understanding that the cost of the service pipes will be refunded as soon as the connection is extended from the curb to the house and the gas is used. Property owners on the south side of the street say that the cost of trenching and laying the Company's service pipes from the mains, which are on the north side of the street, will work a hardship upon them. The officials are investigating the matter, and the extension will have to be made before the street is paved.

Announcements, Section Meetings, Illuminating Engineering Society.

Chicago Section.—The Chicago section will hold its concluding meeting of the season on Thursd ay noon, June 15th. Mr. W. D. Bradley will present a paper on "Natural Daylight Illumination."

New England Section.—A meeting of the New England section will be held to-day. A good paper list was prepared according to the advance announcements.

Philadelphia Section.—Two papers will be presented at the last meeting (16 inst.) of the season of the Philadelphia section. One of these, "Gas Ignition," will be read by Dr. Howard Lyon; the other, enlitled "Lighting a Garage by Electricity," will be presented by Mr. R. F. Zeek.—R. C. L.

BOOK REVIEWS.

"Brown's Directory of Gas Companies, 1911."—Annual directory covering artificial, natural, acetylene and gasoline gas companies. For sale by the AMERICAN GAS LIGHT JOURNAL. Price $5. The directory, now in its 24th year, has been greatly enlarged and improved, containing 640 pages of data. The total number of gas companies scheduled is 2,087. Of these 1,126 are artificial gas; 528 are natural gas; 216 are acetylene gas; 121 are gasoline companies. Parent companies are returned as 94 in number. In addition to the names of officers of various companies the lists of membership in 22 associations are given alphabetically, all of the association memberships being grouped together. The "Directory" should prove valuable to men active in the management and operation of gas companies, as well as manufacturers who desire authentic data regarding the personnel of gas companies.

[Official Report, as Furnished by the Secretary.—Continued from Page 1103.]

PROCEEDINGS, SEVENTH ANNUAL MEETING, ILLINOIS GAS ASSOCIATION.

Held in the Auditorium Hotel, Chicago, Ills., March 15th and 16th, 1911.

Second Day, Final Session.

The final session of the convention was called to order by the President at 2 P.M. The regular motion called for the paper by Mr. R. M. Davis, of Chicago, on

STEAM ECONOMY IN GAS PLANTS,

which was read by the author as follows:

In the manufacture of coal gas, steam economy is of little importance, but in the manufacture of water gas such is by no means the case. When compared with the coke and oil it is a small item, and, in consequence, is very often lost sight of and almost completely overlooked; but think of the large amount of money that has been spent in "perfecting the process of water gas manufacture, and the small percentage of this that has been expended in improving the steam units, which are an essential part of this process." A small sum of money judiciously used, so as to increase the efficiency of the steam units, will pay a very good rate of interest, and it will be the endeavor of this paper to indicate where some of these improvements may be instituted.

Experiments on waste heat boilers are being conducted, and the indications are that such a boiler will eventually be commercially successful. However, until such is the case, we have to deal with the problem of boiler room economy, and it is certain in any case that we will never be warranted in totally neglecting the engine room.

The place to start is, of course, the boiler room. It is not in the province of this paper to discuss combustion, or to outline that which is good practice, for "Kent," "Peabody" and "Bement," easily obtainable, go deeply into the subject. But if you will take some pains and determine your actual boiler room results, I believe you will be surprised at the difference between them and those laid down as good practice.

The difference in heat value between the best and cheapest coal is only about 30 per cent., but the difference in price is more than double. The cheaper grades are harder to work in the fire and will not give quite as high efficiency, but a cheap coal and a little care will, in most cases, pay a big return.

A fair quality of Illinois screenings will run about 11,000 B.T.U. per pound, and will cost about $1.50 per ton, f.o.b. Chicago. Assume the feed water temperature to be 200° F., and the boiler pressure 125 pounds, also the boiler and furnace efficiency at 60 per cent., then we have an actual evaporation of 6.64 pounds of water per pound of coal, or a cost of 11.3 cents per 1,000 pounds of steam for coal alone. I doubt very much if many of you gentlemen are making steam for this figure, but there is absolutely nothing to prevent an approach to it. An outlay of $300 for a water weigher or meter, and $25 for a Morehead or Orsat burette, may seem like money thrown away, but a saving of 10 cents each day will pay interest and depreciation on this amount. If you do not believe in a water meter, flue gas analyses are pretty fair indications as to boiler room results, for if your analyses show 10 to 12 per cent. CO_2 without any CO your combustion cannot be far wrong.

Considerable care should be exercised in obtaining flue gas samples, as the CO_2 content varies considerably in different parts of the furnace and from minute to minute, due to constant changing of the fuel bed. Samples should be taken simultaneously in several places in the flow of the gas between the furnace and the breeching. If there is much difference in CO_2 between any of these, it shows considerable leakage in the brickwork. This is a large source of loss, and one that is very hard to remedy, especially if great care has not been used in the installation of the boiler. In many modern installations the whole of the boiler setting is covered with a steel, airtight casing to prevent air leaks. After the loss in CO_2 between the furnace and the breeching has been minimized, samples should be taken as near as possible to where the gas leaves the boiler, and should represent at least 8 hours. In many places, by means of large expiratory bottles, 24 samples are obtained.

The most steam used in any one place in the gas works is in the water gas generators, and the necessary amount of this steam per 1,000 cubic feet of gas has been pretty well established at 30 pounds; roughly, about one boiler horse power. We have found, however, in most cases, where there is no method of measuring the steam, that the actual amount is from 25 to 75 per cent. more than is necessary, which means a loss of from 1½ to 3 pounds of coal, and a considerable coke loss due to the fact that the steam must be raised from its own temperature to that of the fuel bed. The actual amount used can be very easily estimated by the insertion of a metal disk in the steam line, this disk to have a hole of such size that the absolute pressure on the low side is not more than 58 per cent. of the absolute pressure on the high side. Then, knowing the size of the hole and pressure on the up stream, or high side, the amount of steam passing per minute can be calculated by the formula:

$$\frac{60\ AP}{70}$$

in which A = area of hole in square inches, and P = absolute pressure on the up stream side.

The cost of this is a piece of sheet metal about ⅛ inch thick, a flange union and a steam gauge. The results obtained by this method are remarkably accurate, considering the crudeness of the apparatus used, and its application will do more than any other thing towards economizing in boiler fuel and, incidentally, in generator fuel.

The air used for blasting the generators may be supplied by fans or positive blowers; also, 1 unit may be used to supply a number of machines or a separate unit may be installed for each machine. As far as the gas made is concerned, the results are the same, but the relative steam economies are very different.

In an installation blowing 3 machines it was found that, of the total number required, 50 per cent. was used in making up the leakage in the pipes and in keeping up the pressure of the fan. In another case, in a fan 14,000 cubic feet of air capacity per minute, this was found to be about 40-horse power. Under these conditions, assuming a run of 6 minutes and a blast of 4 minutes, 700-horse power minutes are supplied per cycle, where only 540-horse power minutes are required, which is a waste of approximately 20 per cent. of the total power supplied. This very forcibly indicates the superiority of individual blowers, which may be shut down when a machine is on the run.

The efficiency of a fan is only about 50 per cent. at its most economical output, and as the fan runs at this point for only a very short time, it is probable that the average efficiency is well down towards 40 per cent. With a pressure of 24 inches in the blast line and 2,700 cubic feet of free air per 1,000 cubic feet of gas, $\frac{4}{10}$-horse power per 1,000 cubic feet of gas would be required. If a positive blower with an efficiency of 85 per cent. is substituted for this, the horse power, figured on the same basis, is only about .22 per 1,000 cubic feet of gas. Taking an average engine, with a consumption of 40 pounds of steam per brake horse power, the result would be 16 pounds of water per 1,000 cubic feet of gas for the fan and 9 pounds for the blower. This represents a saving of at least 1½ pounds of coal per 1,000 cubic feet of gas. Outside of economy, a very distinct advantage is gained by using individual positive blowers and equipping the engines with constant speed governors; and that is that a positive amount of air is forced through the generator each minute, making a more uniform condition of fire and eliminating the need of any device for measuring the air.

As far as safety is concerned, there is absolutely no way in which there can be an explosion in the blast pipe, for, when the discharge of the blower is opened to the atmosphere, the machine being on the run, the velocity of the air is considerably above the backward velocity of an explosion, and the worst that can happen would be a flame at the discharge side. In using individual blowers, it has been found it pays to run them condensing, provided the right system is used. If there are two machines, for example, and with each turbine and condenser there is a vacuum pump, the system will hardly pay, because the pumps must operate all the time, and practically 40 per cent. of water is wasted. This waste, together with the interest on the added investment, will more than offset the saving gained by running condensing.

If, however, one pump is used to pump the water to an overhead tank, and from there it is allowed to flow by gravity to the condensers, the flow being stopped while the machines are on the run, considerable saving will be made.

In selecting the engines and exhausters for a gas plant, there are

many things taken into consideration besides steam economy. In most plants the exhausters and engines must be of such a size as to take care of considerable overload above the average conditions, and to run even if the steam pressure should fall very low. With these things in mind, and with price the chief idea, the builders of the exhauster, who generally furnish the engine, are between two fires, and often settle on too small an engine for the work needed. Also, on the cheaper engines, it is hard to design any way of governing except by fixing the cut-off and varying the speed by the throttle. This has two disadvantages:

1. A large increase in the steam consumption; 2, liability of blowing boxes.

For our purpose, as stated before, it is necessary to have a large factor of safety in an exhauster engine, which means that, if the speed is to be governed by throttling, the cut-off must be set at some point that will figure sufficient power at about ½ the steam pressure. This point is generally from ⅜ to ½ of the full stroke, which gives about the same economy as a steam pump. But, by equipping the engine with an adjustable cut off and varying the speed in this manner, economy is greatly increased, as it is always possible to get the expansion out of the steam. In one case, by the addition of an adjustable cut-off, the consumption was reduced on light loads from 77 pounds of steam per horse power to 40 pounds; on full load, from 44 pounds to 26 pounds. If the engine had been designed with the right proportions for the exhauster, this could have been reduced some 25 per cent.

As an example of what economies can be made, an engine, similar to the above, which took from 44 to 77 pounds of steam per horse power, is being replaced by one which takes from 10.7 to 14 pounds per horse power per hour; or, in other words, from one that took from 6 to 10 pounds of coal per horse power per hour to one that takes from 2 to 2½ pounds per horse power per hour.

As far as safety goes, if the engine runs on the throttle, an increased load slows the speed down slightly, and if anything should happen, so as to seal the works' line and increase the pressure, the seal would be blown. If, however, you are running on the cut-off, the speed would vary considerably, and, in the case of complete seal, the engine would stop automatically, instead of blowing the boxes. In building exhausters of late years the tendency has been to increase the speed and cut down the capacity per revolution. This has been made possible due to the perfection in the designing of gears, and as a result the new exhausters are designed for twice the speed formerly specified. This, of course, means better efficiency, cheaper installation, and a great saving of floor space.

A large percentage of the steam used about the works is consumed by steam pumps, which, while of small horse power, require a large amount of steam per horse power hour. In certain intermittent service it is hard to figure out any method of doing away with plunger pumps, which at best are not efficient, but in most cases the substitution of uniplex or single cylinder pumps will give a distinct saving over duplex or double cylinder pumps.

Look at the nameplate of your duplex pump and see what is the specified stroke, then determine the actual stroke of the pump. Estimate the total capacity of your steam cylinder by filling with water, then figure the percentage of the volume actually used in the travel of the piston. I venture to say that, in at least one-half the cases, the clearance is over 50 per cent., which means that the actual increased consumption is just that amount. With the uniplex pump a short stroke is impossible if the valves are properly set, as the length of the stroke is determined by positive valve gear. An objection raised against the uniplex pump is that it pounds; we have not found this to be the case when the pump is properly installed with a sufficiently large compression chamber. You will find that a compound uniplex pump will, as a rule, cut the steam consumption of a simple duplex pump exactly in half.

In a great many cases there is place for the turbine driven centrifugal pump, or the engine-driven positive pump. I say "turbine-driven," because I cannot see any place for a motor driven pump in a gas works. The difficulty of varying speed to fit conditions, and the low efficiency of centrifugal pumps at any other except their designed speed, make it hard to figure any economy for a pump of this kind. But, with properly designed turbine centrifugal pump, it is possible to hold up the efficiency of both the pump and turbine over a considerable range by changing the speed to conform to the amount of water desired. Incidentally the saving in packing and lubricants, to say nothing of increased reliability of a centrifugal pump, will more than make up for the difference in cost between it and a plunger pump.

The type of positive pump best suited for our purpose is the cycloidal pump, which has all the advantages of the centrifugal one, with the added advantage that it can take care of a considerable amount of air and vapor much better than the centrifugal pump. However, there is this disadvantage, an engine for driving can hardly compare with the turbine. The steam consumption in both cases is about the same, 60 to 80 pounds per horse power per hour, as against 100 to 150 for a duplex plunger pump.

Another possible economy may be practiced in many cases. On most pumps more pressure is carried than is absolutely necessary. It is needless to say it costs almost twice as much to pump against an 80-foot head as against a 40-foot head. From 15 to 20 pounds pressure will, as a general rule, give enough water for supplying gas condensers, unless your water piping is too small. If you have elevators on the same pump as that which supplies the condensers, it will pay to put in a separate pump for these elevators, and to cut the pressure on your works' pump to 15 or 20 pounds.

In a good many works the gas is sent out under a pressure of from 15 to 40 pounds; have you ever figured out how much this is actually costing as against how much it should cost? The indicated horse power required to compress 1,000 cubic feet of free gas to 15 pounds pressure is about 1¼ horse power. On the basis of 2 pounds of coal per horse power hour, this would be 2½ pounds of coal per 1,000 cubic feet of gas, or 14.4 pounds of steam. This is exceptional practice, but any good compressor should do 18 pounds of steam per horse power per hour, or about 22½ pounds of steam per 1,000 cubic feet of gas compressed under the above conditions. If you can get 6.6 pounds of water per pound of coal, this would be presented by 22½ divided by 6.6, or about 3½ pounds of coal per 1,000 cubic feet of gas. What is true of the regulation of speed of the exhauster engine is true of the compressor, and the difference between regulation by cut-off and by throttle is true in about the same proportion.

A comparatively new steam unit which is applicable to the gas works is the low pressure steam turbine. All that is needed to produce power with this machine is the exhaust steam from the pumps, exhausters and compressor engines, with plenty of condenser water. If your are near a river the latter is easy, and the former is true of nearly all gas works.

The many pumps and small engines needed make it almost impossible to design a condensing system to take care of them, but by application of a low pressure turbine you can get none of the disadvantages of vacuum on your steam apparatus and still almost double your power, as, in ordinary cases, with pumps and engines, a low pressure steam turbine will give you, horse power for horse power. If there is not enough exhaust, a mixed-flow turbine can be built, using part line and part exhaust steam, and the compound efficiency of a poor engine and low pressure turbine unit will approach very closely the efficiency of best condensing engine unit.

Discussion.

The President—We have listened to the paper by Mr. Davis and will call on Mr. Rafferty to open the discussion.

Mr. Rafferty—I did not have an opportunity to read Mr. Davis' paper, so the only thing left is to make a few remarks along the general line of steam economy in gas works' practice. Mr. Davis says that most of the steam in water gas works is used in the gas generators, and for measuring the steam a device such as a steam disk should be used. Steam disks, while accurate and inexpensive, should be examined frequently in order to assure the superintendent that the measurement for which they were adjusted is correct. There is considerable wear on the disks and, unless they are checked, inaccuracies will not be detected. Another point worth watching is the quantity of steam used to keep the water in the cups of the holders from freezing in the winter. By a series of tests one can determine what pressure is necessary to carry on the low side of the steam disk to keep the water in the cups from freezing for each variation in temperature. If the steam disk is placed in the engine room, the engineer can take hourly readings of the atmospheric temperature, regulating his steam accordingly. Another source of steam waste is where a poorly designed steam injector is used to circulate the water in the cups—oftentimes they strike an open pipe in the cup and let it blow all winter. A further cause of needless steam outlay is in the improper installing of steam traps. Where a unit is of sufficient size an individual trap should be used, being placed as close to the separator as possible. Where one trap used for several units is placed in a basement long leads are required, incurring unnecessary condensation and pipe covering. If each unit had a trap placed on

the floor beside it, the engineer can see if it dumps properly, provided it is a tilt-trap, and can find out if it is by-passing steam. Steam leaks are wasteful and unsightly and should be stopped immediately. The author lays stress on steam economy in the boiler room. Now, blow-off cocks need considerable attention, and at their best give poor satisfaction. You will sometimes notice on a boiler, or battery of boilers, considerable leakage in the safety valves, and the longer that leakage is permitted to continue the greater will be the wear and consequent expense to repair the valve. When safety valves are repaired they often need readjusting, and when a boiler blows off the loss in pressure by the gauge should be noted. I have seen boilers lose as much as 15 pounds while blowing off. This is easily rectified. Of course, it is needless to say that on engines where the load is subject to variation throughout the day adjustable cut-offs increased the efficiency of a plant. Also, the advisability of having an elevator pump is a very good suggestion, for generally we have hose lines going to the machines, and if we have 80 or 90 pounds on these leading lines no rupture will occur in the hose.

The President—Mr. Ikena, will you discuss this paper?

Mr. Ikena—I cannot criticize Mr. Davis' paper with reference to engines very much, but I have in mind something about steam leaks and steam traps. In many instances where pot traps are used, if the fitter gets careless he will connect up a trap running into a sewer, while at other times a trap will be put in some remote place or where one does not see it very often. The result is that that trap may be leaking. You don't know that a pot-trap leaks when connected up in this manner without examining its parts. From the fact that you do not get any water in your engine you imagine that the trap is working in good condition, but at the same time you may be losing a lot of steam due to leaky valves. Therefore, I am always strongly in favor of the tilt-trap instead of the pot trap. Another thing that occurs to me is the use of flywheel pumps in gas house practice to use steam expansively. I do not know that anybody has ever tried them, but I should like to hear some discussion thereon if anybody has anything to offer; I believe the difference in cost will soon be paid for in the saving of steam. In a cold room steam leaks show up oftener than in a warm room. Many times where there is a great deal of noise you cannot hear the small sizzling leak, but as quick as the room becomes cold you can see them with the naked eye, without relying on your hearing. This is another thing that a fellow must look out for pretty close.

The President—Mr. Dirks, will you add to what has been said?

Mr. Dirks—I am not sure I can add to the discussion as I have not had time to thoroughly look over the paper. I believe, however, much economy can be gained right at the boiler. That is something I have had more or less to do with. Mr. Davis speaks about determining conditions by means of the CO_2, both in the furnace setting and in the flue gases. It has been my experience that, unless the greatest care is taken in obtaining flue gas samples, the resulting analyses are not worth much. In a series of experiments I put in 24 experimental pipes across the flue and took samples from them. In addition I took just a single sample as is ordinarily done. The variation was as high as 50 per cent. That is, instead of showing an analysis of the flue gases of possibly 10 or 11 per cent. of CO_2, the actual analysis on the average throughout the entire section was only about 5½ per cent. I think a good many of the results from flue gas analyses are misleading on that account, and that we should not place too much confidence in CO_2 results only. A CO_2 recorder is a good thing, but it is up to the fireman in the end, by observing the conditions of his fire through the side door of the boiler, to determine the conditions of his fire. After a furnace has been installed and a particular fuel has been decided upon, several weeks should be used to learn the best operating conditions for that par ticular fuel. However, this is hardly applicable to gas works as I have seen them, as they were dependent so much on using some of the waste products (tar, for instance) that they had but little use for coal. At least, in most of the plants in the city, especially the larger ones, they have possibly one boiler running with coal as a fuel, all the rest being run with tar. Of course, we may be able to find out more about the efficient operation of tar under a boiler, but I don't feel that I am in a position to discuss that question.

Mr. Ikena—Does Mr. Davis figure that with the positive pressure blower he can get more air than is now being got through the fire 8 or 9 hours after the machine has been clinkered, and whether he could get up heats much higher? Also, whether in getting that air through he would not have to use a great deal more steam in proportion to the amount of air he would get through?

The President—Mr. Davis will answer later. Mr. Battin, have you anything to say on this paper?

Mr. Battin—I would like to ask Mr. Davis one or two questions. He speaks of taking 24-hour samples of flue gas. I would like to ask him what he has been able to get as the best result on CO_2 on such a sample? Also, whether he found as yet any steam meter which can be put into a steam line feeding an engine or pump which is taking steam that will give you any idea as to the consumption of that apparatus? As to the relative service of the positive blower and the fan, the former in the old days was undoubtedly the best thing when you wanted high pressure. But the tendency seems nowadays to so design your gas machine that it only requires a small blast pressure to get air through the fire by making all the openings through the machine very large. When this is done, and a good steam turbine is used, especially the old type of fan with a good Corliss engine, the economy of the fan seems a little better than that of the positive blower.

Mr. Dewey—I have had some experience in the burning of tar under boilers, and have obtained fairly good results from it. We found that, assuming the oil to have 18,500 B.T.U.'s per pound, the tar gave us 21,000. It proved a very satisfactory method of using our water gas tar, and it was fairly efficient, even though it contained sometimes as high as 25 per cent. water. We atomized it with steam and, instead of having the tar forced through the burner with steam, we used a method on which I think there is a patent, which allows the tar to feed in with the suction of the steam atomizer, giving a very intense heat. We were able to overload our boilers far too much if we were not careful.

Mr. Unger—I do not think mention was made in the paper as to automatic control for heating and cooling. Several good instruments are on the market which control cooling water for cooling and steam for heating. I have had experience in heating ammonia stills, using an automatic system that controls the steam supply, and the exhaust steam, for instance, from the liquor pump and the air compressor can be thrown into the still and utilized there. Of course, that enables you to economize in steam.

The President—Mr. Murphy, will you add something to what has already been said?

Mr. Murphy—I could not say anything in relation to Mr. Davis' paper with the exception that, in taking 24-hour tests for gas samples, we find the CO_2 is not very staple. By suspending the samples for some length of time the CO, gradually drops out, so I cannot see the economy of taking a long sample.

Mr. Woodin—In addition to Mr. Rafferty's remark on steam leaks, I would state that leaks may very often be stopped by caulking, provided the location of leak permitted. After a leak has been stopped the second or third time it is best not to attempt this method again, as the leak will only be increased. As to the 24-hour test in taking CO_2 samples, I do not believe this method reliable, for the reasons stated by Mr. Murphy. I would like to get some information on this point as to a fan blower furnishing the air blast to the machine, by 20 inches of pressure and sometimes as low as 12. Now, the blowers operate directly to the generator. I wonder why it would not be practical to have the blower connected to a tank built something on the order of a gasholder with a pressure of about 50 inches. That would make allowance for a steam engine running all the time. If you take off two or three of the gas machines we would still have the same pressure in our auxiliary tank that would guarantee us a constant pressure and would do away with a measuring device. Of course, the objection to this would be in the cost of installation. It would perhaps be out of question to adopt it, except in a very large plant say of 10 million output per 24 hours.

Mr. Jackson—I scarcely feel qualified to criticize this paper; but, where the author says, "Provided the right system is used," referring to condenser systems for blower turbines, I believe that that point should be emphasized. This remark applies to condensers in general. Very good results, of course, are obtained by engines running condensing, under right and favorable conditions. As a result, some engineers have drawn the conclusion that it always pays to run engines condensing. In a case I personally knew of, where the idea was to build a model plant on a small scale, and where the water used for cooling was impure, containing considerable suspended mat ter, so that the frequent cleaning of the surface condenser rendered the system practically worthless. It was afterwards found out tha it could be made to serve, although it was hardly advisable, by installing a different system of condensing, using the same water, but using a jet condenser instead of the surface condenser, thus not sav-

ing the condensed steam to put back in the boilers. Another point I might mention was in the case of laying out a plant where it was decided to run condensing, using city water for this purpose. When figured out on a basis of actual dollars and cents it was found that, to make it a paying proposition, it would be necessary to be able to buy the water for cooling at a rate of 24 cents per 1,000 cubic feet. Needless to state the plant was built to run non-condensing.

Mr. Rice—This statement: "I cannot see any place for motor-driven pumps in a gas works," sounds just a bit broad. Aside from the fact that we use electricity for driving some of our fan blowers, we find it very advantageous to so drive 1 or 2 pumps for clearing drips, etc., and under certain conditions it is more economical than steam power.

The President—Does anybody else desire to discuss this paper? If not we will have to call on Mr. Davis to reply to some of the questions.

Mr. Davis—Taking the questions in order as asked, I quite agree with Mr. Rafferty on steam for the holder. I have personal knowledge of good many instances where a lot of the steam has been saved. Some years ago, in Chicago, we turned on steam the 1st of November and shut it off the 1st of May. The idea about having so many steam traps is very good, except that in many cases by changing the piping you can do away with many of the steam traps, thus cutting down your chances for leakage. I also agree with Mr. Dirks that it sometimes is hard to account for the vagaries of flue gas analyses, but as a comparative test, from time to time, provided they are always taken the same way and ordinary care used, they are pretty fairly reliable. At least I have so found in my experience, and I would say they are as reliable with tar as with boiler coal. It is easier to get your economy with the tar, but at the same time the fires are apt to smoke, and the fireman, as a rule, in order to be on the safe side and to keep from smoking, will put in too much air cutting his economy to 65 per cent., or below. As to the efficiency of the fan, that 50 per cent. efficiency is taken from several curves furnished me by the fan men. The curves vary considerably, some of them going as high as 65 per cent., but when they were brought to the same manner of testing, they all got down to about 51 or 52 per cent.—that is the 24-inch pressure fan. The idea of a positive blower is to get a like amount through the fire all the time. With a fan, as your back pressure increases in the machine, you cut down the amount of air and lose much of its efficiency. Mr. Battin spoke about the 24-hour samples. I know of plants where such samples are taken, but I really ought not to have said 24-hour samples, since they are taken twice in 24 hours. They use 5-gallon aspirator bottles, the samples being analyzed last thing at night and first thing in the morning; in other words, every 12 hours. They use salt water in these and claim to get good results. Personally I have never taken any over 8 hours, and have found 10 to 11 per cent. of CO_2 in them. At this place, where they take two 24-hour samples, a combination furnace of coal and tar is used. Really, all the coal does is to furnish a bed for air to pass through and be preheated before it strikes the tar. Their 24-hour samples have shown as high as 16 per cent. In respect to the steam meter, Prof. Allen, of Worcester, while in the office the other day, stated he had tried the Dodge meter made by the General Electric Company, and got very good results from it. That he really considered it was more accurate than to weigh the water going into the boiler. Mr. Battin speaks of the air pressure being cut down on air machines. It seems to me, from all I can find, that it is being increased. Another thing is the question of automatic temperature controls. Two or three of these in work on condensers for water all worked well. They seem to cut down the water used considerably. Mr. Woodin's idea of running the blowers all the time into the holder, in order to work out, it seems to me, would take a pretty good size holder. A 12 foot machine takes around 14,000 cubic feet of air a minute. In order to handle them it would take a holder of such a size that the depreciation and interest would probably eat up all the saving that you might make. Mr. Rice cannot agree there is no saving in the motor pump, but the pump runs so seldom, and the electrically driven one will cost so much more that the saving in steam disappears when you figure the depreciation.

The President—Was the result you announced there of 11 and 12 CO_2 on chain-brake practice?

Mr. Davis—Yes.

The President—Is there to be anything further on this paper?

Mr. Battin—As to using condensing plants, that, of course, would be out of question in the case of small ones. Even in the former I think that, by the use of proper engines and pumps, the amount of exhaust steam can be reduced to such an extent that the feed water heater will absorb practically all of the heat units, consequently no saving will be made by running a condenser, besides making a great saving in the original installation cost; for, of course, if you put all your steam back into the exhaust heater there is no loss. In this connection the small plants, by using, as Mr. Davis suggests, well-designed, single-cylinder pumps, instead of the old duplex pumps, and by using the steam disks on the gas machines and by watching carefully the steam consumption of the holders and so on, can reduce the steam coal consumption in many instances one-half.

The President—The next paper is that by Mr. M. J. Dewey, of Cairo, Ills., the title of which is

INDUSTRIAL APPLICATION OF GAS.

The term "Industrial Gas" as I shall use it, means gas used directly in the procedure of commercial or manufacturing industry; consequently, the subject of lighting in any way will not be discussed. Therefore, to assume that this paper will cover fully all points that could come under its title would be absurd; but, if you will permit me, we will call it instead a "Synopsis of the Industrial Application of Gas." The use of gas for heat as a part of one's business is confined to our own time, which means that a new science is in its infancy. Let me emphasize the word science, for such it is, as accurate, as clearly defined, as chemistry, physics or astronomy. It deals with the combustion of gases to produce power, light and heat, and to attain its ends with the greatest conservation of material. It endeavors to convey to the minds of its students that the use of coal and other crude fuels was not intended for small units, but that these materials should be defined by a great single unit and the finished product be delivered to its ultimate consumer. Before going too far into the details and methods of using gas industrially I wish to touch lightly upon the theory of combustion.

In order that we may collect all of the heat that is in the gas we must oxidize all its material into non combustible gases and allow the outgoing waste gases to depart at the same temperature of the gas before it reaches the burner, which means that all the gas must be oxidized to carbon dioxide and water and lowered to the inlet gas temperature, and to have a perfect appliance all of the heat must be directed upon and absorbed by the object to be heated. Again, the energy in the gas must be delivered as heat energy, not as light energy. Therefore, the efficient burning of gas resolves itself into an infinite number of explosions of the proper mixture of oxygen and gas, the former, of course, being taken from the air.

In our study of chemistry and metallurgy we were taught that the flame of the blowpipe could be made reducing or oxidizing, and this principle is used in many industrial gas appliances. For instance, when steel is subjected to the direct gas flame for the purpose of tempering or annealing, it should be placed in the reducing flame or one that has not an excess of oxygen, in order that the stock be not wasted and carbon therein burn to carbon dioxide. It is, therefore, evident that a gas forge, tempering furnace or annealing furnace, properly adjusted, will improve the stock rather than damage it. Again, if it is desired, the oxidizing flame can be used to place a proper color on the finished work.

In the case of heating rooms, of which I shall speak more fully later, if the heat be driven into the room, drawn from an oxidizing flame, the people, though breathing some waste gases, will also be breathing what is termed nascent oxygen, which is very invigorating. Now the burning of gas to obtain heat is accomplished by two distinct methods. One, the mixing of air and gas before it reaches the burner by a jet of gas drawing in air from openings properly constructed upon the siphon principle; the other, the mixing of gas and air by a mechanical process.

The first type of burner is called the atmospheric, the second is the blast type. Their scientific difference lies in the fact that the former burns gas in an atmosphere of air and the latter burns air in an atmosphere of gas. Now, the explosive mixture of air and gas lies approximately between 8 per cent. gas and 92 per cent. air and 25 per cent. gas and 75 per cent. air. In the atmospheric type we are able only to burn gas and air when the percentage of gas is a little greater than will form a perfect mixture, while in the blast type we are able to even go too far and get an excess of air which also tends to destroy available heat. The blast type of burner can be used successfully even though the gas pressure is very low, and by the use of the constant pressure regulator, set at the outlet of the meter at the minimum pressure shown by the recording chart, we are able to

state to the consumer that his conditions are continually the same. This proves a help, not only to the user, but also to the maintenance department, which can know that any fault must certainly be local. I had intended to give a little discussion in this paper concerning the various types of industrial appliances, but the information can be so easily obtained elsewhere that I will limit it to a few semi-original and successful ones that are not widely known.

Heating small theaters would at first seem absurd when the question of gas for fuel is suggested, but the problem has been solved in one fairly large theater, and can be in every other small vaudeville or picture house. By placing a blast pipe burner having a capacity of 500 or 600 feet per hour, so that the flame is drawn into a larger circulating fan which leads through heating pipes to registers placed in aisles of the theaters, and the air from the room be drawn through openings near the floor back to the room that contains the appliance, one is able to heat the room comfortably in a surprisingly few minutes, and it is only necessary for a very low rate of flow of gas to be used to keep it in this condition until the close of the performance. It is simply a matter of closing all openings to the outside to make this method an economical one. The advantage of this device is that the heating process need not start until about 10 minutes before the doors open; there is no cold storage room, no smoke, no smell and practically no need of an attendant. Again, the stage and dressing rooms can, by a little studying, be heated at the same time and with the same burner. I do not mean that this principle can only be used by theaters, but any place where occasional heat is required, such as churches, assembly halls and many other meeting places.

Not long ago I had occasion to install a ham boiler, and as I was detailed to design the appliance I immediately began thinking. The receptacle for the hams was rectangular, being 8 feet long, 3½ feet wide and about 30 inches deep. The sides were double, having a 1-inch air space, and vent holes at the top, the outside jacket extending 8 inches below the bottom of the tank; 1½ inches below the bottom two drilled, 1¼-inch pipe burners run the entire length, and through these burners are connected a single suction tee, gas and a direct-connected $\frac{1}{10}$-horse power, A. C. fan blower. An angle valve is placed between the manifold pipe and the second burner, in order that the pressure on both can be made alike, and when only one burner is needed the other can be turned off. This proved very efficient, and the distinct advantage of materially reducing shrinkage in the weight of the hams, also permitting them to retain the tasty juices that would otherwise be boiled out, due to varying temperatures. The same device proved beneficial in scalding chickens. On testing this appliance we raised 175 gallons of water from 78° to 198° in 38 minutes, with the gas burning at the rate of 420 feet per hour, or an efficiency of a little better of 83 per cent.

In each of these installations a type is represented which has been barely introduced but yet are embryos of what may be a great industrial field. You have, no doubt, already noted that wherever there is a chance I am partial to the blast type of burner. I believe that a great many dissatisfied customers who have had atmospheric installations have been made boosters by changing them over to the blast type.

Now, into this comes a subdivision: The positive pressure blower type and the fan blower type. The former will hold its pressure and velocity fairly well, if there is a very short run of straight pipe, and one (not more than two) burners connected; but where there are many small burners, or where more than one installation is supplied by the same blower, it is far more satisfactory to use the positive pressure blower. The advantages of the fan blower are: Low first cost, low power cost and simple operation, while the advantages of the positive pressure blower are perfect adjustment, adaptability to any number of burners and appliances up to its capacity, and also the advantage of locating it at a distance from the burner.

In deciding just what methods shall be employed in installing an appliance great care must be taken, and unless it is something extraordinary, do not do any experimenting with your customer. It has very damaging effects; it burns his gas and loses his confidence in the ability of the company's employees. An industrial man, therefore, must have many and varied requirements. He must be familiar with all methods of manufacture of the different customers and prospective customers' plants; he must have good address, good literary and mechanical ability; in fact, he must be an all round gas man.

When the industrial fuel expert has gained the confidence of the prospective customer, he has the installation practically sold, but should he fail in this one point the position is hopeless. It, therefore, behooves a company to secure a good industrial man and back him and boost him to all their customers in every way possible.

Although it may seem like time and money wasted, it is wise to educate all industrial consumers regarding the combustion of gas and its properties in general; also, to make the buyer realize that, although gas is an economical fuel, it is very expensive when waste and negligence are permitted; that he will take possession of an installation that is capable of fine adjustment, which has been built exactly right by experts who have specialized in that particular line. Let him realize that his appliance is thoroughly modern, and can do its work faithfully and accurately, because it has reached a state of perfection through long and carefully conducted experiments. This results in the consumers being converted to your way of thinking, and eventually places an installation in nearly every place you think one can be successfully used. An industrial salesman must spend plenty of time with his prospective customer, and, if he knows his business, he will be able to guarantee perfect satisfaction to his customer, no matter what the proposition may be.

In conclusion, I wish to impress upon the mind of the reader that the industrial department, though thoroughly scientific, requires one thing more than anything else; and that one thing is good, hard common sense behind it. If each company had an industrial man, blessed with this requirement, we would soon see great progress in the industrial field. We would speedily hear of numberless large installations that with our present knowledge we would fear to attempt. This article was written in the hope that the managers and superintendents here represented may push their industrial work, and that the industrial men themselves may add a little more energy in their work to perfect this, our new science.

Discussion.

The President—From Mr. Dewey's paper it is very evident that he gave to the subject much thought and study. I feel, however, some here can probably add a little to what was written.

Mr. Harper—This subject is one of great importance to the small gas company as well as the commercial man. I think Mr. Dewey has opened a subject that we all ought to discuss. While I do not want to be quibbling, it is rather startling to a chemist to find out that you can burn air. He says on page 59, "Their scientific difference lies in the fact that the former gas burns in an atmosphere of air and the latter burns air in an atmosphere of gas." However, that is not a matter for much comment. I am hardly in favor of the heating of rather small theaters with gas and sending the products of combustion into the atmosphere of the room. From the hygienic standpoint it may be all right, but it is open to criticism by a coroner or some one of that sort in the case of a poorly-ventilated place in which a death has occurred. It may be that the carbon dioxide will not be considered unsanitary. While speaking on this subject I might bring up the question of carbon dioxide. It is a well-known fact that carbon dioxide from combustion of ordinarily illuminating gas is not necessarily harmful. Its formation in that way is ordinarily considered to give a harmless atmosphere when the resultant carbon dioxide is not in excessive quantity. The presence of parts of carbon dioxide per 10,000 parts of air is often considered harmful, but that is only true if the source of the carbon dioxide is the exhalation of lungs containing harmful organic matter. Vivian B. Lewes tells us that if the source of carbon dioxide is the combustion of illuminating gas and no organic matter exists, 20 parts of carbon dioxide is not injurious, but a coroner or some one of that sort might misconstrue it. If he finds 12 or 15 parts in the air he may consider it is harmful and come back on the gas man. This ham boiler is certainly an interesting use of gas. I do not quite see how Mr. Dewey gets 83 per cent. efficiency. That is higher than we have been able to get on all heating appliances of that nature. I have not figured it out, not having time to do so, but I would like to ask him if he figures that on a basis of net heat value or gross. We are using the gross value for all our calculations and feel that that is the best basis for comparison. He speaks of the industrial man and that "he must have good address, good literary and mechanical ability; in fact, he must be an all-around gas man." I think he cannot make that too strong, and I feel it is to a gas company's advantage to get a first-class man in its industrial department, because he is in touch with the public and is in a position to do much good or harm. He also has a chance to advance the sale of gas, and if he has mechanical ability he can grasp the situation and note whether there is a possiblity for use of gas. I would like right here to bring out certain points concerning gas appliances from the manufacturing standpoint. We find a great deal of trouble in the gas appliances

that are sold. The manufacturers neither have the time nor money, as they consider it, to equip themselves with and use the necessary apparatus to test out their own appliances, with the result that often a very poor appliance gets on the market. The consumer almost always blames the gas when the appliance operates poorly. In some cases the appliances are so bad that they are dangerous. I have in mind a case of a refuse destroyer which was so designed that a 1-inch flue pipe, with 4 sharp 90° turns in it, was used to conduct away the products of combustion of 100 feet of gas. It was absurd on its face. The result was that when it was lighted the flames flew out through the draft door and often set on fire combustible things happening to be nearby. Such things may be easily rectified by men having ordinary knowledge of combustion. The manufacturers should take great care in the construction and designing of their appliances. The question of combustion brought up by Mr. Dewey leads me to suggest we often forget that a Bunsen or non-luminous flame, even though it has a nice blue color, has a considerable tendency towards imperfect combustion if placed close to a relatively cold surface. We found by repeated experiment that a Bunsen flame, having a relatively cold surface in contact with it, like a cooking utensil or water coil, will often form carbon monoxide. That is due to the premature cooling of the gases before complete combustion has taken place. I would like to emphasize here that I hope the manufacturers in the future will take greater care in designing their appliances, for here in Chicago we have a coroner who is very vigilant, and we wish only to have those things that will give us first class efficiency and be hygienic. I have discussed this paper a little incoherently, perhaps, the speech being quite impromptu on my part, but I feel that we ought to compliment Mr. Dewey on this paper. He wrote it rather hurriedly, and he would have done even better had he had more time. I would like to see all the rest of the gentlemen interested in this subject talk to us regarding it, for it is very interesting.

The President - Does any other gentleman care to discuss Mr. Dewey's paper?

Mr. Ikena—I do not think Mr. Dewey is burning air as Mr. Harper seemed to infer, but I know that air furnished to a Bunsen burner, under pressure, for some unexplained reason, I don't know why, seems to give a better combustion. I have seen it several times. We use it particularly in one of our shops with the soldering iron, and get a far better result by forcing the air to these burners than we would otherwise obtain.

Mr. Harper—I will answer that thought of Mr. Ikena: First, it is a well known fact that the more condensed your gas and air are the better the combustion. An air blast virtually mixes your air and gas in a thorough manner, and, you might say, condense it, thus aiding the chemical combination. In such way you get a higher temperature, because you have condensed your gases, and the necessary air, in a relatively small volume.

The President—Is there to be any further discussion? If not, we will call on Mr. Dewey to close.

Mr. Dewey—What I meant by burning air in gas was simply this: Assuming this room contained all gas and no air, also piping containing air under pressure and equipped with gas burners, a light could be applied to the burners; therefore the air flame would be burning in an atmosphere of gas. This principle is easily demonstrated in a laboratory. If you would examine the inner cone of an atmospheric flame you would find that it contained unconsumed gas; again, if you should investigate the inner cone of the flame from a blast burner, when the air pressure is greater than the pressure of the gas, you would find it not gas but air. As to the heating of theaters, we, of course, produced carbon dioxide in the air. That fact I will not dispute, but the large amount of secondary air required to reduce the intense heat of the blast flame to comfortable temperatures caused the percentage of CO_2 to be so small that it was not noticeable. The air seemed at least to be fully as invigorating as when other methods of heating were employed. I did not take an analysis of the air in the room, but nobody ever complained of it, and the management of the theater was well satisfied, due to efficiency and economy. The electrician lighted the gas furnace, and as the main room began to get warm the curtain was raised slightly and the direct return flue was closed, thereby allowing the stage to receive the warmed air from the main room, and then from the stage the returning air passed through the dressing rooms and on to the furnace, to be reheated. When all of the required area had arrived at the proper temperature the burner was turned down from a consumption of about 600 feet per hour to 50 feet per hour. This maintained the desired temperature throughout the performance. The inlet to the circulating fan was a sheet iron pipe, 24 inches diameter, lined with asbestos. This acquired a great deal of radiated heat, and gradually gave it off after the burner was turned down. To obtain the efficiency of the ham boiler, I filled the tank with the required amount of water, read the meter, lighted the burner and took at the same time a calorimetric test of the gas. After the water in the tank had reached 190°, which was the temperature required for boiling hams, I closed the burners and reread the meter, only to find that the water contained 83 per cent. of the B.T.U.'s contained in the gas used.

Mr. Unger - May I ask what Mr. Dewey means by the expression, "Heat energy, not light energy?" How is that to be applied?

Mr. Dewey—I mean that there is a certain amount of energy, for instance, in the open flame tip burner, that is thrown off in the form of light, not of heat energy. It takes energy to make light, and a certain amount of that energy is taken away from the heat. Therefore, the gas would not show the same number of heat units if the test were taken on the yellow flame, as it would on the same amount of gas burning a blue flame.

The President—Is there anything further in connection with Mr. Dewey's paper?

Mr. Murray—I would like to ask if Mr. Dewey figured the comparative cost of the gas for heating his theater as compared to other fuels.

Mr. Dewey—The manager did not tell me how much his coal cost him, but gas cost him 45 cents for each one of 3 performances per day on every day that it was below freezing. He said that gas was cheaper by far than other fuel, plus the cost of keeping up the fire.

Mr. Murray—That basis of 45 cents for heating is on the basis that it cost him $1 a 1,000?

Mr. Dewey—His gas cost about $1.10 a 1,000.

Mr. Battin—In this connection we had in one of our small places a lodge hall in which meetings were held only once a week. The manager thought he could heat that hall cheaper with gas than he could with coal. Of course, we did not think it feasible, but told him we would loan him the gas heaters to try it out with. He put a lot of ordinary gas heaters around the lodge hall, and about 15 minutes before they met they heated up the the room. Having found it was a great deal cheaper than coal, he adopted it and has bought the stoves and is using them regularly. I take it that there are a large number of lodge halls where meetings are held only once a week where that same system could be used.

Mr. Dewey—I would like to add, the prediction of many prominent gas engineers is that the fan type will eventually supersede the positive pressure type. The tendency seems going that way all the time. We are finding new methods of using the fan blower that we knew nothing of a few years ago, and they are proving highly satisfactory.

Some Acknowledgments.

The President - I want to extend the thanks of the Association to you, Mr. Dewey, for your paper. If there is no further business, I want to take this opportunity to thank the committees, the officers and the members for the hearty co-operation extended me at this meeting. I appreciate it very much and hope in 1912 this point I brought out in my address, that each-and every one of us will make an effort to increase our membership, will be followed out. There is room for them. We can get them if we only make the effort. I, therefore, hope that next year the majority of you will come back with at least one application. There being no further business this, the Seventh Annual Meeting of the Illinois Gas Association, will stand adjourned.

On motion of Mr. Rice a hearty vote of thanks was extended to the President and Secretary for their untiring efforts on behalf of this meeting, the ballot being by rising vote. The result was announced, and the convention was declared adjourned.

[Official Report—Furnished by the Secretary—Continued from Page 1104.]

PROCEEDINGS, THIRD ANNUAL CONVENTION, PENNSYLVANIA GAS ASSOCIATION.

Held at Reading, Pa., April 12, 13 and 14, 1911.

First Day—Afternoon Session.

The President—The next paper is that by Mr. W. L. Chewning, of Reading, the subject of which is,

DISTRIBUTION SHOP PRACTICES.

This subject covers so wide a field that a paper of indefinite length might be written under its head, but I believe its main object is for

the purpose of inviting discussion. Therefore, I will open the discussion by describing a few of the methods used in Reading, some of which may be good and others bad.

Orders.—Orders for work, for which the Company makes a charge, come to the shop in triplicate form and are numbered serially. There is a space at the top of the order for classification which is filled in by the office before it goes to the shop, and all expense for time and material incurred on the job is charged to that classification. The original and duplicate are handed to the fitter who is to perform the work. The original order is used as a "Work Card," and so marked. On its back the fitter records his time and the material used other than that specified on the front of the order. The consumer also signs this order, certifying thereby that the work has been done satisfactorily; and in no case does the dispatcher accept the order from the fitter unless so signed. The duplicate, which is marked "Store Room Record," is given by the fitter to the storekeeper in exchange for all material other than pipe and fittings necessary to complete the work. The triplicate is held by the dispatcher against the fitter and is marked "Shop Record."

After the dispatcher compares all work cards turned in by a fitter at the end of the day with his time card, to see that he has charged his time correctly, the duplicate, or "Shop Record," is filed away in the files of the distribution shop, the original being sent to the office.

Orders for work for which the Company does not make a charge are treated in the same manner, with the exception that the "Store Room Record" is left out. If any material is needed to complete one of these orders, it is drawn from the storeroom on a storeroom order blank, which blank is also used for drawing out pipe, fittings or any material not specified on the face of the charge orders. For these gratuitous orders we use various forms, depending on the nature of the work. They are:

Leaks.—A pink card is used for this, and complaint covering any kind of leak is noted thereon.

Complaints.—This card is used for all complaints other than leaks.

Service Orders.

Meter Orders.—This card covers meters set, removed or exchanged.

First Service.—A service order is first turned over to the general foreman, who inspects the property, marks on the inside wall the proper location of meter, then orders out the proper supply of pipe. After the pipe is delivered the order is given to the foreman of a service gang, which usually consists of three men and the foreman. We use both the regular two-wheel service cart and the closed wheelbarrow. The latter is of value to us in cases of very short services, of which we have a great number, for the reason that it can be pushed by one man. In short service cases, where the barrow is used, two men go ahead and dig the ditch, the other two follow and install the pipe and fill in the ditch, while the first two men go ahead and open up ditch for the next service. With the cart this cannot be done, four men being required to push it. On the other hand, the cart is more advantageous, as it is large enough to house all the tools, whereas in the case of the barrow the men have to store their tools at night in some cellar or yard.

These carts and barrows carry a standard stock of fittings, from which stock the fittings necessary to install a service are used. At the end of each day the fittings used from stock are noted on a storeroom order (two copies being made) and given to the foreman on his round of inspection. These are turned over to the driver of the delivery wagon, who draws material from the storeroom, where the carbon copy of order is retained until the original, signed by the foreman of service gang, showing that he has received the material, is returned to storeroom, when duplicate is destroyed and the original filed. A storeroom return order is made up to cover the pipe which may be left over on each job.

Service lines are run to the meter cock in 1 and 2-family houses. At present we are considering the advantages of having the service gang complete the setting of the meter, by having all inside measurements taken when the inspection is made and all inside pipe cut and threaded in shop and delivered with the service pipe. The service gang then has only one thread to cut, that on the pipe running from main to front wall. In order to do the work in this manner a pipe-threading machine would be necessary to make it pay, but the question is, would such a method be the most economical for a city of our size? We feel quite certain it would prove so in a city where large numbers of services are installed daily.

It is customary for a meter set order to come from the office with the service order. These orders are handled by a wagon and one man, except in cases where order calls for sets for a row of houses, where all meter sets are installed whether the houses are already occupied or not. This work is done by the same method as a house-piping job, which subject will be taken up later.

In setting a single meter we make solid connections with double-swing joints and an adjustable meter-shelf for support; but in setting two or more meters in one cellar we have the service pipe run under the meters, which take the place of shelves. This service pipe is supported at its far end by cementing in wall a long nipple capped on end and screwed into tee on service. In running a service pipe, if we find we cannot get sufficient cover and at the same time have it drain back to the main, due to the main being too high, we figure that some day the street will be paved, when our main will have to be lowered. So we start from the house and run the service at proper cover to, say, within 4 feet of the main. Here we place a street ell, inserted in a cross, in the opposite side of which is inserted another street ell, from which service is continued on a slope to the main, where it is connected to the main with the usual swing-joint. The branch of this cross looks up and down. Into the lower branch is screwed a capped nipple about 12 inches long, which serves as a drip. In the upper branch is the bushing through which the pumping pipe passes. When the main is eventually lowered this drip is abandoned and the entire service made to drain towards the main. In the meantime the drip must be pumped regularly.

House Piping, Appliances and Lamps.—Orders for this class of material are first turned over to the inspector, who goes to the address where work is to be done, marks the location of outlets (if not already marked by the solicitor), finds when the consumer would like to have the work done, although the answer invariably is "As soon as possible," finds out whether there is a suitable place to fasten vise, takes approximate measurements of pipe to be run and makes a rough sketch showing the new piping. He then writes out an order for delivery of the following: Standard box of fittings. The necessary pipe (generally a little more than he thinks necessary). A standard 4-inch by 4 inch by 10-foot timber, with clamp, should he find that there is no suitable place for vise.

The standard box of fittings is of three kinds: 1 with all necessary fittings for a house-piping job; 1 for running line for stoves, and 1 for water heaters. The locks of the boxes are alike; in fact, they are the old meter locks. The keys are in the possession of the storekeeper and the fitters only. The 4-inch by 4-inch by 10-foot timber referred to is clamped to a joist in the cellar and drilled at different points to receive bolts which hold the vise in place. A supply of these timbers is kept in stock. Fitters doing this class of work carry their tools in a light, galvanized iron tool case. They also carry their vise with them. There is no necessity for a fitter to come to the shop at any time, as he received his orders from the foreman on his tour of inspection. When a job is completed a storeroom order is made out for the fittings used from the stock in the box and placed in a pigeonhole in the box made for that purpose. He also makes out a return storeroom order for the pipe left over, the box, timber, etc. This is given to the foreman, together with the fitter's time card and finished order, which has the time consumed and material used noted on back, with signature of party for whom the work was done, showing that the work was completed satisfactorily.

Small jobs which require fittings are done from wagons. These are equipped with a certain stock of pipe and fittings. Upon the completion of each job a storeroom order is made out covering the material used, and these are turned over to the storeroom at the close of each day. In exchange the storekeeper gives the fitters the material specified on the order, which replenishes his stock and he is ready for the next day's work.

Small orders, such as incandescent lamps, parts, etc., which require no fitting, are taken care of very efficiently in pleasant weather by a wheel motor-van. This machine also cares for the majority of complaints and small leak orders. In weather prohibiting the use of this machine, deliveries and complaints are handled by the fitters on foot. Large chip baskets are used by them for this purpose.

Recently we have been paying very close attention to the inspection of house piping done by plumbers in new houses. Previously we had been more or less careless in this inspection, consequently very often were obliged to replace this piping with larger pipe or run a separate line from the meter in order to give sufficient flow for arcs, small hot plates, etc., which we were selling. In addition to the usual requirements we specify a fuel line (¾ inch at least) from riser to kitchen. We had more trouble in enforcing this requirement than any other. We have finally succeeded and now each new house is equipped for a gas range in the kitchen.

In order to enforce this inspection, we sent a circular letter to each master plumber in the city, advising him that we desired an opportunity to inspect all piping before floors were laid and walls plastered, and that after a certain date we would not pass any piping jobs unless they came within our requirements, copies of which could be had in pamphlet form for the asking. We also informed them that we would refuse to install a service until our inspection was made and a certificate mailed to the plumber. By degrees the plumbers called for these pamphlets and did their work accordingly.

In cases where the piping does not pass our inspection, we have a form printed on a postal card on which there is a blank space where the nature of the trouble may be inserted. This card also asks the plumber to notify us when he is ready for another inspection. We are fully convinced that this close inspection will do more towards eliminating complaints in the future than anything else we could do. In most cases the best and more progressive plumbers welcomed this inspection, especially when they began to realize that we intended to be absolutely impartial. Without an exception the builders were pleased to have this close inspection made.

Material broken by fitters, other than pipe and fittings, is taken care of in the following manner: When a fitter breaks any material, either in delivery or when installing, a regular storeroom order is filled out by him for the broken material. This he signs, and at the end of the month each fitter is handed a memorandum of the material broken by him. If he cannot offer a satisfactory explanation to the engineer, or if the breakage seems excessive, indicating carelessness, he is billed for same.

Some might think that this method would encourage fitters to install defective material, trusting that it would not be noticed, and if noticed and reported that it would not be traced back to their negligence. We, however, have overcome this to a great extent by thoroughly investigating every complaint of this kind, and where the fitter is at fault compelling him to replace the material on his own time and in all cases charging the material to him. As a further means of offsetting this tendency, we send a return postal to the consumer, inquiring if the work was completed satisfactorily and whether our employees who took part in the work showed a desire to give good service. It also asks if the consumer is considering any other work. These cards are mailed out upon completion of every work order, and are used in about 30 per cent. of the complaint orders.

Quite frequently the fitters go to a place where they have orders to do work, find the consumer has other work that he wishes done, but which he did not order through the office or a solicitor, such as running a few feet of pipe for an extra outlet, etc. In cases of this kind the fitter asks the consumer to sign what we call an Agreement Card, which certifies that the consumer agrees to pay for the extra work he wishes done at our regular rates. A supply of these cards is carried by each fitter. If the fitter has the necessary material to do the work, he completes it and turns the card in to the dispatcher marked Work Completed. The fitter then draws from the storeroom sufficient material to replenish his stock and marks the storeroom order Agreement Card to follow. This order is later checked against the agreement card in the office. If the fitter does not have the necessary material to complete an order taken by him, he turns in the card marked "Not completed." It is then treated as a sales slip.

As a means of increasing the efficiency of the shop force, I believe regular meetings of the men to be very effective if handled rightly. We hold a meeting once a month at which we discuss the problems that arise daily, the mistakes made, the complaints that come in, and how they might have been avoided, etc. Also, every other month at this meeting we aim to have a paper read and discussed (which we make as interesting as possible) the greater part of the evening being spent in this manner.

At present we are keeping a comparative record of work done by the fitters. If we can get it systematized in such manner that it will be fair to all, we hope to further increase the efficiency of the department by offering a substantial prize to the fitter having the best record within a given period. Up to this time we have been unable to decide on a suitable plan, due to the great variety of work done. We, however, have one in mind as follows:

Each class of work is valued at so many points, depending on the time we think it will require the average fitter to complete it. For instance, a stove line would require about 3 hours and would be valued at 12 points, or 4 for each hour. At the end of the stipulated period the fitter having the most points per dollar paid in wages wins the prize. This you say may induce the fitter to hurry with his work and possibly do poor work, but all work of any size is inspected. Then we could have a system of demerits for poor work or complaints caused by fitter, each demerit cancelling a point made. We realize it is exceedingly difficult and requires close attention on the part of the foreman, who knows what each man is doing, to get a fair comparative record of the men; but should we be unable to perfect the system sufficiently to offer a prize, we feel that our energies will not have gone to waste, for the reason that the men know we are keeping a record of some kind and have been doing so for nearly a year, and the knowledge that his work is being recorded has a good effect.

Discussion.

The President—Now, gentlemen, the paper before you should appeal to every man that runs a gas plant. We hope to have a general discussion on this paper. I know that Mr. Chewning is waiting for criticisms. Who will open the discussion?

Mr. Bains—This is not intended as a discussion of the paper, but only a little wrinkle that may be worthy of mention. Mr. Chewning speaks of carrying around a vise for house work, and he then will have a stick of timber 4 by 4 by 10 feet long, but recently we saw a ratchet stock that does away with a vise. It comes in two sizes. The size we are now trying cuts up to 1 inch, which is approximately all house piping work, and it has worked satisfactorily. Has anybody else any experience with it or not? It does away with the vise and the trouble of carrying lumber or drilling a hole through a man's coal bin to put up a vice.

Mr. Rhoades—Does not Mr. Chewning, regarding the pumping out of this drip on the service, find that that becomes rather expensive after awhile?

Mr. Chewning—Yes, if there were many of them; but those cases are very rare. Not over 50 in our city have mains so high to run the service that it would drain to the mains, and at the same time have the proper cover. We, therefore, have comparatively few drips of that type in use. It is rather expensive for the drop, yes; but there is nothing else we can do unless we want to lower the mains right away.

Mr. Rhoades—The idea I had in mind was this: You say you drop about 4 feet from the main. And how far are the mains from the curb?

Mr. Chewning—As to the first, no regular distance, and the average is about 8 feet from curb.

Mr. Rhoades—Would it not be just as well if placed at the curb line. You probably could cover from your curb and drip, both ways from that point, then use the same thing.

Mr. Anderson—May I ask a question on this same detail? Mr. Chewning speaks of using a bushing in the upper branch. Is that his practice? We follow the rule of the plumber on that, never varying a bushing, the latter being an unsatisfactory fitting in that it is liable to cause leaks.

Mr. Chewning—First, about the drip. We do not put it under the curb. Supposing the main is on the far side, it would be, say 15 to 20 feet from the curb. When we do lower the main we take up that service for 15 or 20 feet. We place the main as close to the curb as we can, to have as little surface to displace as possible. Sometimes we run the pumping-pipe to the curb, in order to make the pumping easier and lighter.

Mr. Rhoades—That is the point I was pondering. It seems an expense to dig up the drips every time you pump them; it would quickly run into money. I was wondering whether you run a line from the drip over to the curb to avoid that difficulty or trouble.

Mr. Chewning—We run a line to the curb, and then, when that drip is abandoned, the pipe is cut off and left in the ground; it being ½ or ¾ pipe, so there is not much loss. As to the bushing, we put bushing only on drips. We consider it bad practice to put in anything save drips, but the latter all carry bushings.

Mr. Lamson—A matter Mr. Chewning did not seem to bring out is what he does when, going to a consumer to install work, finding his men have to go away, how do they handle the return order on that? I would like to hear what is done under such circumstances.

Mr. Chewning—As to the material that goes back into the store room?

Mr. Lamson—No; for the work. How do you send the men back to do it? Do you have a specified time or form to do or to follow?

Mr. Chewning—A big order means sending a fitter who goes on foot, and is instructed to find out when the people expect to be home and when we can get at work. If a small order is given to the supply man on the fitting wagon the next day, then he gets out those orders on his rounds; hence if the people have not got home the second time there is not very much loss. We make 3 calls on small orders. If the people are not home on the third call we refer the order to the office with the notation, "Three calls made and no admission." Then the office, through the solicitors, I believe, finds out when we may fill the order.

Mr. Lamson—I asked that question because personally I have had a great deal of trouble on that class of work. I have tried several times to get in and couldn't, so to overcome that difficulty I started this plan. A man with card goes to the house; if he can't get in he leaves the card noting he called at a certain time for certain work and could not get admission, and asking them to notify us when we

can do that work. It does away with sending a man 3 or 4 times to do the work, and so satisfactorily solves the matter for us. If there is a better method of doing it I would like to hear it.

Mr. H. H. Ganser—Mr. Lamson brought up a matter that has troubled everyone here. We have had considerable trouble and I know that others have fared likewise. It is a matter that looks impossible to handle properly or effectively. Fitters are often sent out with pipe to make installations who find no one home, but under no circumstances do we permit those fitters to return to the shop and say they cannot get in. We have them resort to the telephone—in these days they are very frequent—to notify the office. If the foreman is in the office we can reach him, and he often takes out another order. Frequently the same wrench and piping and fittings will be proper for the next installation. Another matter brought up by Mr. Chewning has reference to the vise. Our fitters are equipped with a 7-pound vise, which they attach to a support of 3 or 4 feet of timber or a coal bin or the cellar stairs. There being nothing in the cellar to which they can make an attachment, they very often work out in the yard, and I yet have the first time to hear of any fitter not being able to properly locate his vise. As to the service installation, I disagree in some measure as to Mr. Chewning's method regarding drips. I dislike drips, and would much rather have a drip in the cellar that was going to remain as long as that building was going to remain, rather than have it in the curb as a temporary proposition. It is much better to put that drip in the cellar, then go there to draw off your condensation carefully. If it is going to leave a bad odor on the premises that is readily removed by a sprinkling of vinegar, the latter we always have on hand. We don't throw it around promiscuously, but use it with discretion, and we find it very effective. I know some of you are familiar with its use. I question the putting of a drip in the street in any place or under any circumstances where it can possibly be avoided. Drips are easily lost sight of, and are difficult things of which to keep a proper record. Often one has to return to the office to look up your record to determine its location, and often no record is found. It seems far better to construct a shallow main, strike the curb stone and have your drip the other way. We often put in a piece of pipe 2 inches, and dropping it down as a leg, using it as a drip, if it is a large service. There may be good reasons not to do so.

Mr. Frick—All Mr. Ganser needs to convince him that the cellar is not a proper place for a drip is to have one freeze, split a fitting and fill the house with gas. Then he will place those in the street (whether lost or not), but not inside the premises.

Mr. Chewning—Mr. Ganser said they usually attached the vises to beams of coal bins, etc., but in the paper it is said only where there is no suitable place for the vise, in the latter instance I should say it is the case in perhaps 5 per cent. of the places visited. We only resort to this timber-and-plank plan I spoke of in the extreme cases. The Climax stock and die would work all right if one had to deliver this timber every time; but as in the majority of places there is a suitable place for the vise, the Climax stock is a little cumbersome to handle. It is much easier to have this vise at the work where the man can get at it. In Reading the fitters do not have helpers. With helpers they could probably handle the Climax better, but one man, I think, can get on better when the work is even with his body.

Mr. Bains—I am not sure that the ratchet vise or stock spoken of is new; in fact, I know very little about it, save that we got it probably a month or so ago. We had much trouble through the men not using good judgment in putting up the vise. Getting into a cellar to put a bolt hole through an upright they would break into coal bins. Then there is the question of carrying around a heavy vise. Not having the timber ready or all right one naturally looks for something to take the place of the vise. This arrangement has two arms, one of which grips the pipe, then it rests directly on the cellar floor or on the step, and on the lever arm, with a ratchet working the die; the latter works on the pipe. One man can operate it, for it weighs only 4 or 5 pounds; that is, from a small pipe up to 1 inch. I fail to see why it will not be a fine thing for small work.

Mr. Ganser—Experience is a good teacher, and my question will signify that I have never had the experience. Does drip water freeze?

The President—Mr. Ganser's question is very pertinent, in view of the fact that it was thrown back to him from somebody else.

Mr. Frick—Drip water will freeze, but drip oil will not.

Mr. Ganser—Now, 30° being the freezing point, will cellars very often have such a low temperature? If they do there must be negligence from another standpoint, and if a cellar gets to 32° you are not going to give service. That low temperature may be caused through a cellar window having been left open, and a night in freezing weather is apt to produce an indifferent service, so I think before condensation takes place you will have a report of poor supply.

Mr. Bains—Frequently in pairs of houses one house will be vacant. In the cellar of the vacant house the thermometer will get below 32°, and that will cause a burst in the other house. We have had that experience.

Mr. Frick—I was going to say, getting away from the subject to a certain extent, but running along the idea of taking care of accidents and damages to my line, that is a principal thing for which we should look out. One good accident case will do us more harm than all the increased business we could get in a year. For that reason, although these cases are rare and fortunately do not happen at frequent intervals, I should say one case of the sort would be sufficient to have a rule in force that drips must not be put inside of cellars. I would ask as to the way orders are handled, noting the material on back of completed order, if that does not delay the passage of the routine of that order in getting through the shop and back to the office. In other words, when a considerable amount of work is being done every day, does not the storekeeper have his work very much congested, necessarily holding back the orders in the storekeeper's hands for a longer time than should be. Does that not prevent the order from getting straight to the office where they can be recorded and the bills for the material made up and sent out. That is what I am trying to find out.

Mr. Chewning—Naming material on the back of an order is not for the benefit of the storekeeper. The charge is made in the storeroom when the material goes out, not when it is completed. Putting the material on the back of the order is merely for figuring up cost in the office. After the order has been completed the bill is made up and sent out.

Mr. Dutton—Does Mr. Chewning, respecting the practice of setting meters where houses are connected, mean to install a meter? How does he get word of people occupying houses.

Mr. Chewning—We just put the connections to and from the meter. You may think that somebody might come along and steal the brass. Is that the point?

Mr. Dutton—No; I wondered whether you meant meters. You said meter sets; do you mean appliances to set a meter or not? A meter set to me means meter installation. I took it that meant installation of meters where the houses are communicating.

Mr. Chewning—No; in a row of houses we find it is more economical to put in all the meter settings. Then a special fitting wagon is not sent out when we get an order for a meter, the latter being sent out on what we call the regular meter wagon. When we get an application for a meter this order is turned over to the meter wagon.

Mr. Rhoades—In regard to that meter setting; what do you mean—the riser and cock?

Mr. Chewning—The outlet also.

Mr. Gillingham—Mr. Chewning at one point says: "At present we are considering the advantage of having the service gang complete the setting of the meter." About 2 years ago I delivered my service order with meter connections and meter, and had the service gangs complete the full job right up to the house, and found the foreman of the service gang could soon be taught to do it in as good shape as our regular meter man, and save considerable money in our meter setting. Part of his time was devoted to that, while the gang was working in the ditch. I have, as Mr. Chewning speaks of, sent the gang away. We may send one man out to install a new service, but in the majority we deliver the pipe and meter right along with the job. If a separate line was put in where service and everything else were completed, the men set the meter. Our applications are not as large as many you have here in Reading or other places, but it works out very well and we save money by it. I note in the paper mention regarding inspection of house piping, which I believe is one of the best things a gas company can do. I was also through that matter in a town where no such thing had ever been contemplated, but inside of a year we had all the plumbers, with the exception of one or two of the "snide" sort. My wish, however, is to know, in case a plumber put in a job that will not pass our inspection, have we any backing from the State authorities, giving us the right to withhold the setting of the meter from that line of pipe prior to its being fixed up according to our specifications? Can they compel us to give that man service or gas whether his house piping complies with our specifications or not? Legal knowledge on that point I would like to have. I believe a gas company should have a specification up to which every plumber should be required to live. We should have an opportunity of standing pat, refusing to give service through that installation unless the latter were placed according to our specifications. That point came up and we simply argued it down, because one or two plumbers objected to any inspection, and it was not long before the other plumbers were so well pleased with the fact that the gas company inspected, and had a set of rules under which all worked and each knew that a job to be bid on went in according to the gas company's specifications. We all worked along the same size of pipe in the same building. However, once in a while, plumbers getting a job would jump the fence and put in some ¾-inch pipe all over the house and have it connected. However, we refused to do so, which resulted in its being torn out and a proper installation put in. However, it came to the question whether to connect to such an installation, or does a State law or city ordinance give us the right to make the bids of plumbers conform and accord to our specifications?

Mr. H. G. Williams—I think the American Gas Institute had that question in committee, and it was decided that we had to connect up. I think that if anybody applies for gas we must furnish it, if the house is piped, whether or not the piping is up to the gas company's requirements as to size, etc. In this State the only way we can get around it is to have the owner realize that the planning is not up to our requirements.

Mr. Owens—One method of getting by the fact that the plumber was not living up to your requirements would be to get up a set of rules and try to have them adopted by the building department.

Mr. Ganser—We had considerable experience along this line and solved the problem this way. Some time ago we issued rules as to szes for use in the piping of houses; we had been troubled with many runs of ¼-inch pipe on the last line of the house, and finally said we would not set a meter where any ¼-inch pipe was used. This was like shaking a red rag before a bull to the plumber, and we

found shortly after rather more ¼ inch than usual was being used. We then appealed to the builders and owners. On learning of any builder about to commence an operation we mailed him our copy before the houses were lathed, and our inspector visited the premises to ascertain whether or not the pipes were of the right size to warrant good service—the term "good service" with the gas company should not be made a joke; it should be lived up to in every sense, and it is not a very difficult matter to convince the builder that a ¾ or ¾-inch pipe will fill up with very small particles of rust or sediment and he soon sees the wisdom of this. Now, if it acts in other places like it did in Norristown, the builder will soon support you. Many Pennsylvania towns are creating departments of building on municipal account. I would suggest that you visit the inspector before his rules are submitted to Councils for approval and adoption, and have him understand the capacities of pipe under certain pressures, and I think it probable he will co-operate with you.

Mr. Chewning—We have had that up many times with the plumbers. We practically admitted in the end that we could not oblige them to run pipes of specified size. As Mr. Williams said, you can only deal with the builders, letting them understand that if they worked in harmony with us we would work in harmony with them.

Mr. Rhoades—Right along this line you will find, as a general thing, that most buildings have had the supervision of local architects. We overcame this very trouble by furnishing our architects with a complete list of sizes of pipes that should be used to permit a certain flow of gas through such. We secured their co-operation in giving estimates on buildings to secure proper piping, so when the builder bid on a job he knew the proper sizes.

Mr. Bains—On the same line, co-operating with the architect, the builder and owner, we have a system of inspection. The builder ordinarily will not approve the plumber's bill until the plumber gives him our certificate; and the same with the fixture man. We pass on the fixtures. The owner and builder put it up to us to see that the job is right. They consider we know that end of the business and they look to us for it, and the plumber's bills are not paid unless we say the work is right. Of course, we cannot guarantee that the work will remain tight. That is beyond us; but when we test it out thoroughly and our test is tight, we sign a certificate to the fitter. We have the same system used in Philadelphia, which is a very elaborate one. There they have to live up to the specifications according to ordinance, and I think that is the only place in the country where such stipulation is imperative.

Mr. Anderson—If I may be allowed to return to the safety drip in cellar, which is more in service right now, while I have the opportunity, I would like to ask this question. I always felt we did not run any risk in putting drips on house services in houses, but this has raised a question in my mind. I believe that a drip ought to freeze, because if it did not freeze we would not have to blow the service with alcohol to the pump. I have followed the plan of putting a cross on the end of the service where a drip was necessary, extending a pipe down from that cross with a cap on it perhaps 18 inches to 2 feet. Now the question is whether the drip water which collects in the drip freezes, and whether the expansion will be dissipated along the length of pipe. Has any gentleman had actual experience with such a drip breaking and causing serious trouble in filling a house with gas.

Mr. Bains—I had that experience. In that house (a frame one) the drip was crossed with a piece of pipe in the end of it. At the time the house was vacant, but the drip did freeze and break, the gas getting into the other house. The residents discovered it in the day, fortunately, and no serious damage was done. We looked for the leak in one house, and followed it from the cellar into the vacant house, where we found the drip had cracked. I think the break was in the nipple.

Mr. Rhoades—We had a drip on an outside line of ¼-inch pipe. The pipe filled with condensation to the point of partially cutting off the flow of gas, but not enough to freeze in the main line; merely enough to cause bad service. The drip on examination was found frozen. When we removed it one could see that, although expansion had taken place in the pipe, it was not broken in any degree, so closed it with an ordinary cap.

Mr. Dutton—That question of piping by the plumbers has not been mentioned. I thought some one would bring out whether much difficulty had been experienced with the plumbers in order to get them to fall in line, because it is worth while to the companies. I know places in which small fees are paid to the plumbers to encourage this practice of having the plumbers agree to the plan of the piping installed in a home and that eventually resulted in the company and the plumber co-operating, so that each would know what was being installed as to sizes, etc. I think that will be more than overcome. Experience has shown that the cost of the small fee was overcome through the fact of the piping being installed at first hand in size sufficiently large for future appliances. This does away with tearing out and enlarging the supply pipes in a house when we are going to add additional fuel appliances, either for heating on the upper floors or the installation of water heaters. Along that comes renewals. That is an actual fact, which I think is worth while to note in discussion.

Mr. Frick—Along this line of freezing I had a sad experience some years ago, which happened in Reading. A 4-inch pipe strung along the side of the street was ready to put in when we were overtaken by a very heavy snowstorm and the temperature got extremely cold, the frost practically putting an end to our main work. This pipe when strung was put along the gutter, not in a proper way. The spigot was in against the grade, so water would not run the opposite way, or the highest end of the pipe was against the curb, which resulted in successive freezes and thaws, a considerable lot of water going through those pipes I don't know just how long the pipe was left there, but when on starting to look them over we found about 50 lengths (4-inch pipe) or over 50 per cent. were split. Now if there is a chance for lateral expansion I would say that it should be taken up in a pipe of that kind.

The President—Will Mr. Chewning tell these gentlemen just how to treat the plumbers to get them satisfied and do just exactly what you want them to do?

Mr. Chewning—Well, we attended various committee meetings of plumbers and encouraged them to send committees to us on this subject. The principal object of committee meetings was the wish for us to run services before piping was inspected. We never did agree to do so, and stand that way now. I believe schedules were received from them that it should be done some time in the future, but the date had not been set. A thing we are going to keep away from as long as possible is to put a service in until the job is completed and inspected, for if they once get the service in we are at the mercy of the plumber. He does not care. We encourage the bringing of the plans to us before the work is done; and when they do so they usually bring the scheme to us in the shape of a little sketch or piece of plain board. We transfer that to a piece of paper, make it in duplicate, and giving the plumber one copy while we take the other, saying, "Now, here is the schedule that we are going to pass, and the only size we will pass; this small size." In that way there is no misunderstanding at all.

On motion, a vote of thanks was passed to Mr. Rhoades for his paper.

(To be Continued.)

The St. Louis County Gas Company's Distribution Division's Permanent Home.

Now that the St. Louis County Gas Company, of St. Louis, Mo., is surely in business on its own account, President Einstein and his associates wisely concluded its distribution division should be on a sufficiently large scale to warrant a headquarters therefor equal to the handling in a sensible way of the increasing volume of business that is its share. The building is located on a suitable plot in the Webster Groves section, and it is designed to serve the purposes going with its department offices, meter shops and warehouse. The illustration gives a fair idea of the structure which has a frontage of 132

feet, a depth of 170 feet, and a height equal to the forming of 2 spacious stories. The lower floor carries the offices proper of the distribution department, one corner of the building being reserved for the public, fitted up suitably as a showroom, with office provision for the commercial force, and another section given over to the uses of a pay station.

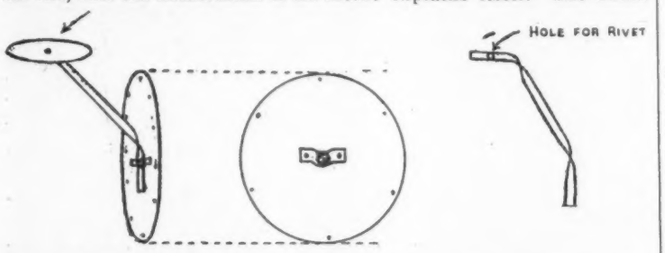
The rear wings to first floor are for warehouse purposes, and the second floor is intended for the meter shop with its many ramifications. The entire rear end of the structure is arranged in court-yard style, the space being covered or roofed under steel trussed covering. In this yard are placed the wagons that carry the meters, fittings, etc., that are used in completing the usual distribution jobs, and the wagons are so laid up during the night as to suitably adjoin platforms attached to the main structure, from which may be easily and safely transferred the materials, such as meters, fittings, piping,

ranges and all other matters necessary to the completing of the jobs for the following day. At the rear of this covered court-yard are the Company's stables, garage, etc.—these are not shown in the picture; and back of them are the railroad sidings and the sheds, where pipe and other material are received direct from the cars and stored.

The building, including cost of the site, involved an expenditure of not far from $60,000, an investment that will pay a big interest return through saving in wear and tear of materials stored and used, to say nothing of the great number of hours of labor that will be saved through convenience of handling, and the greater conveniencing of the men.

The Hearne Simplex Adjustable Gas Meter Shelf.

There is being put on the market a very simple, cheap, adjustable meter shelf (metal) to suit the various heights of meters. It is composed of three parts, which can be momentarily put together, ready for use, and the illustration to all intent explains itself. The small



disk, being placed under the center of meter, which is the strongest part, thus leaves free the solder parts for inspection for condensation, or leaks of any sort. The disk can be either rigid or loose on bracket, so as to fit snugly should the meter be slightly out of plumb. The larger disk is fastened permanently to the wall, thus avoiding breaking or disfiguring of same, as often happens with present style of shelves. The bracket is connected from top disk to lower one through a clamp with set-screw, so that the bracket case can be raised or lowered to suit the meter. Should the latter be taken away at any time the bracket and top disk can be taken away with it for further use. This shelf can be used for 3, 5 or 10-light meters, a simple blow with the hammer doing the work.

Management & Commercial Methods.

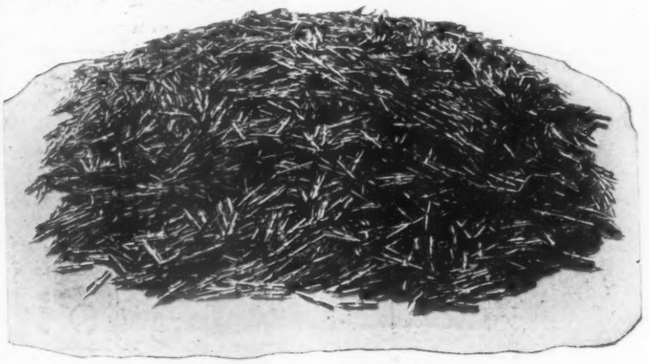
GAS HEAT FOR HARDENING AND ANNEALING STEEL PEN POINTS.[1]—Of interest to the manufacturer whose business it is to treat quantities of small steel parts should be the gas furnace recently purchased from the industrial division of the home offices of the U. G. I. Company, by the Turner & Harrison Pen Manufacturing Company.

From the time this Company started in business, up to within a year ago, it had been accustomed to heat its steel pens for hardening in a coke-fired furnace, from which it obtained results (so was said and believed) that were satisfactory, and for a long time it could not see the greater advantages of gas as fuel. But, after having made the change, and having used gas for nearly a year, it is now just as strongly in favor of it as it was once unwilling to consider it.

When first we sought the business it was contended against our claims of superiority for the gas method by many arguments, of which the following are a few samples: The Pen Company had a coke furnace and it was in good condition, and was not handicapped by the large amount of space it occupied. The proprietors could see no saving in labor, since the men who worked the furnace had other duties to perform during the day when the furnace was not in use, hence their services were valuable. The men had become so skilled, after years of practice in the use of the coke furnace, that their labor was practically indispensable. And, then, coke was cheap; gas was too costly.

However, on our subsequent visits to the factory, especially the hardening department, many facts were learned which, when pointed out, ultimately enabled us to convince them that our claims for betterment were well founded, and we proved that the use of gas as fuel was a business proposition which they could not afford to pass. It was learned that, in order to get the coke furnace ready for use, it was necessary to start a fire by noon of the preceding day, then to dress the fire at short intervals during the night. Atmospheric and chimney draft variations affected the condition of the coke fire to a serious degree. Again, the furnace, the coke and the ash pile so completely filled the hardening room that the work had to be made ready on the floor above. The room was dirty, hot and stuffy.

These inconveniences and the arduousness of the task kept the hardener and his helpers uncomfortable, and a workman whose humor is affected by such conditions cannot prove the best posssible investment for his employer.



Pile of Steel Pens Treated in One Operation.

Eventually the gas furnace, with the necessary blower, was installed, and from the very first the furnace has been successful. No change of working routine was found necessary. The pens are packed for hardening and annealing in the same boxes as were used in the days when coke was used in the plant, for the capacity of the gas furnace is equally as great as that of the old coke furnace, consequently it is not necessary to harden any more frequently. Stated briefly, the gas furnace is the coke furnace with all its troubles left out. Every old working condition, too, was very much improved. The hardening room, once so dirty and uninviting, has now been repaved and whitewashed, and it is as clean and cheerful as the other parts of this well-kept factory.

Gas Furnace Used for Hardening and Annealing Pen Points.

The hardener arrives at 5 A.M., lights the furnace, makes ready his first lot of work, and at about 7 o'clock puts it into the furnace. About 7:30 he withdraws the first and charges the second lot, repeating this operation about every half hour until his work is finished. Late in the afternoon he puts into the furnace the pens to be annealed, heats it up, shuts off the gas, closes the vents and goes home, leaving the whole to slowly cool during the night. The addition of a pyrometer equipment has added much to the success of the installation.

All pens are equally well tempered, no matter whether the day be bright or dark, the weather clear or foul.

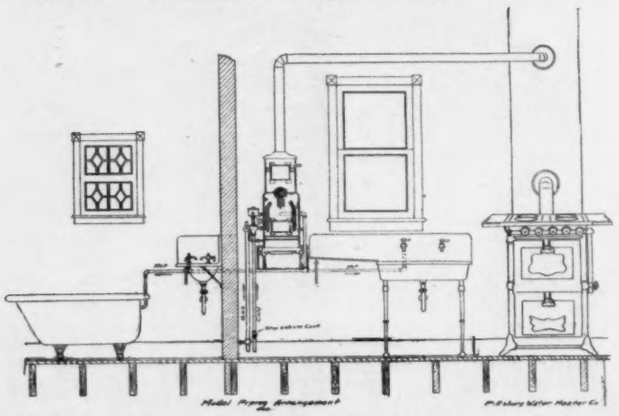
The coke and ash pile is gone. In the floor space so gained the pens are now made ready to go into the furnace, and the men work in a clean, cool place and under healthful conditions. Consequently, they are happier.

Any man in the shop can now harden pens as well as the most expert hardener ever hired to work by the coke method, and so easy has it become that results are as uniform the first day as on the hundredth day. Compare this latter condition with that endured in the days of the coke method, and all will agree that the few dollars difference between the coke cost plus coke oven troubles, and gas cost, plus gas furnace conveniences, is money well spent.

1. Compiled by Guy S. Apeldorn, and edited by John S. Welch, chief of the department. Reprinted from May number of "New Business," U. G. I. Co.

A Medium Sized Automatic Water Heater.—One of the latest developments in gas water heater apparatus is the "Bungalow Automatic," recently placed on the market by a well-known Company engaged in the manufacture of this line of apparatus. This heater was designed on the non-contact principle, as an automatic to reach the masses—a happy medium between the small tank heater and the larger automatic.

The price at which it sells has placed it within the reach of every pocket book and the great demand for it bears out the assumption that such a heater would meet with general favor.



Among the many self-contained features are the patent deflecting hood, coil supports, seamless copper heating coils, the double wall jacket, removal fire section of heating coil, non-stickable patent automatic valve, pilot light, cast iron Bunsen gas burners and the drip pan.

It is said that great care has been put forth in the working out of the many details, the result being an ideal installation for small homes of sufficient capacity for supplying hot water to bathroom and kitchen.

Recent Patent Issues.

Prepared for the American Gas Light Journal by Royal E. Burnham, solicifor of patents and counselor in patent causes, 833 Bond Building, Washington, D. C., from whom illustrations and specifications of any patent mentioned below may be obtained for 10 cents.

993,372. Gas Cock. H. S. Hipwell, Reading, Pa.

993,625. Automatic Gas Valve. W. B. Stoudt, Bernharts, Pa.

993,687. Gas Burner. B. F. Jackson, Jersey City, N. J., assignor to J. Hardie, Sr., Pittsburgh, Pa.

993,697. Gas Globe Holder and Burner Tube. H. H. Martin and W. C. Smith, Maryville, Mo., assignors to Free Light Acetylene and Manufacturing Company.

993,714. Safety Gas Cock. L. Popp, Cincinnati, O.

994,102. Measuring Device for Gas Machines. J. F. Anders, St, Louis, Mo., assignor to United States Safety Gas Machine Company, same place.

Items of Interest
FROM VARIOUS LOCALITIES.

Mr. C. E. Hubbard, purchasing agent for the Youngstown (O.) Consolidated Gas and Electric Company, will retire from that position the 21st inst. He will return to his home (Hartford, Conn.), there to engage in business on his own account. Our informant adds that, at time of writing, a successor to Mr. Hubbard had not been appointed, although he intimates there is a strong likelihood that the choice would fall upon Mr. Paul Karcher, a result that would be altogether welcomed.

The Lighting Committee (Messrs. E. T. Jenks, C. E. Weston and C. W. Maxim) appointed to arrange for the reconstruction of the municipal gas plant at Middleboro, Mass., has authorized the making of the following contracts for new apparatus—the awarding of these means the virtual reconstruction of the works' system: A 4-foot water gas set, to the Western Gas Construction Company, with the necessary connections, valves, etc., and a storage holder up to retaining 50,000 cubic feet to the Davis & Farnum Manufacturing plant, of Waltham, Mass. The apparatus is to be ready for use by September 1st, and when finished the plant will be in position to send out 125,000 cubic feet per day.

The proprietors of the Peoples Gas and Electric Company, of Stoneham and Reading, Mass., have applied for an extension of their franchise. They agree, in case such extension is granted, to make the following concessions: To supply gas at the net rate of $1.50 per 1,000—at present the rate is $2.25; to put down 4 miles of mains forthwith, the mileage to be increased by or to 10 miles within 3 years; to make extensions on service account free for the first 100 feet, and to furnish 50 feet of house piping free to each new consumer using 10 illuminating burners, or a stove of 2 ovens and 4 burners; and to furnish meters free.

Mr. Ronald Crawford, for several years Manager of the Stamford (Conn.) Gas and Electric Company, has resigned, in order to assume the management of the Oven Equipment Company, with headquarters in New Haven, Conn. At the last meeting of the Board of Directors of the Stamford Company, the Directors complimented the retiring Manager in very hearty fashion, also presenting him with a token of their regard and esteem and good wishes for his future. Mr. Crawford's successor in Stamford is Mr. Alfred W. Dater.

At the annual meeting of the Georgetown (D. C.) Gas Light Company the shareholders elected the following Directors: Messrs. M. J. Adler, Wm. B. Orme, Wm. A. Leetch, S. T. Brown, R. H. Goldsborough, Wm. A. Mearns and S. L. Nicholson. The Directors subsequently perfected the following executive organization: President, Mr. Robt. D. Weaver; Vice-President, Mr. M. J. Adler; Treasurer, Mr. H. H. Flather; Secretary and General Manager, Mr. Robert L. Middleton.

Mr. A. S. B. Little, writing from Nashville, Tenn., under date of the 30th inst., says: "I noticed with a great deal of interest the Special English Correspondence, communicated by Mr. Norton H. Humphrys, in your issue of the 29th ult., page 1052. It seems to me that in the past very little attention has been given to this question of purification in gas works; and I judge from the matter in the issue mentioned, that you will do your best to keep that interesting subject before the notice of gas engineers in an intelligent way. In our little way the Consolidated Gas Purification and Chemical Company, have been trying to stir up an interest in modern purification methods, and while I must say that most gas engineers are somewhat indifferent to this important matter, quite a number of the most progressive ones very cheerfully and thankfully accept the information that we have sent out. Some gas engineers do not take the slightest notice of any information sent out by manufacturers on any subject, so when a manufacturer receives over 300 letters from gas companies, expressing very great appreciation for the information conveyed, then it shows conclusively that they are looking for information of this kind regarding the modern use of oxide. Your communication, therefore, from Mr. Humphrys will I am sure draw special attention to the pamphlet on purification that we are sending out, and which we will gladly forward to any address on receipt of an invitation to such effect."

A correspondent in Scranton, Pa., forwards the following under date of the 30th ult.: "Last Saturday the Capouse Gas Company, of Dickson, Pa., opened its handsome and well equipped showroom, carrying a wealth of examples of the newest and best applicable devices in connection with the modern use of gas for lighting and cooking. Of course, it was an innovation for the residents of Dickson City and the nearby towns. The display rooms were thronged with users and prospective users of gas, and the people were amazed at the white gas way that splendidly illuminated the building and the approaches thereto. There were placed on the exterior of the building 3,000 candle power of white-way lights. The windows were decoratively illuminated with art glass, amber, antique and hammered gas domes, together with highly illuminated 'booster' pendant and white-way lamps and portables, various in type and artistic in design. The spacious display room was artistically equipped with all the latest designs and methods of lighting, showing one of the greatest displays of domes, pendants, portables, and all the various shades, types, colors and designs of brilliant and artistic lighting of hotels, stores, residences and streets. All known cooking, and almost every known type of industrial devices for using gas fuel were on exhibition, and competent demonstrators were on hand to explain how and what each piece of apparatus could be trusted to accomplish. The attendance was strong in numbers and representative in quality, and General Manager Stack, of the Scranton Gas and Water Company, was more than pleased over the suc-

cess of the 'opening.' I take it for granted that you and your readers know that the Capouse corporation is an offshoot of the Scranton concern, and that the gas distributed in Capouse is manufactured by the Scranton folks."

THE proprietors of the Painesville (Pa.) Gas Light and Coal Company has awarded the contract for a new set of modern purifying apparatus, to the Gas Machinery Company, of Cleveland, O. The Painesville gas men are also improving their distribution system, being led thereto by the constantly increasing growth of their city, which growth is of the truly substantial sort.

THE gas cooking demonstration, recently carried out under the auspices of the Milford (Mass.) Gas Light Company, was an unqualified success. The exhibition room was in the commodious hall of the Y. M. C. A., and the attendance was far beyond the hopes of Manager Lasher. The demonstratress was Miss Caroline Putnam Webber, of New York, and she was ably assisted by the Misses Winston, Hicks, Kimball and Rogers.

THE application of one Joseph Martin, who asked the Council of Detroit, Mich., to grant him a 30-year franchise, permitting him and his associates to sell natural gas in that city, was denied by the Councilmanic Committee on Franchises. Martin peremptorily declined to name the parties in interest, and the Committee refused (and it would seem quite properly) to order a feed for the pigs in the poke.

COMMISSIONER FASSETT is insisting that Spokane, Wash., shall equip itself with an output whereunder the authorities may make investigations of the quality of the gas supplied whenever the spirit moves them thereto.

"J. A. C.," writing from Gloucester, Mass., under date of the 6th inst., says: Dear JOURNAL: On the night of May 31st we lost both our coal and coke storage sheds by a fire, which originated in a carpenter shop on Parkhurst's Railway, which adjoins our property. The sheds are a total loss, and the contents were much damaged. The probable loss on both sheds and contents will be from $20,000 to $30,000, fully covered by insurance. The sheds will be immediately replaced by a modern, up-to-date fireproof structure. But little damage was done to our manufacturing plant, the making of gas having been stopped for not over 2 hours.

MANAGER TIPPY, of the Grand Rapids (Mich.) Gas Light Company, has been authorized to announce that hereafter the net rate for gas in that city shall be 80 cents per 1,000 cubic feet, irrespective of the use to which the gas may be put. The concession is dated back to all gas consumed after May 1st, 1911. The old schedule was thus: For the first 1,000 cubic feet, 90 cents net; for the next 49,000 cubic feet, 80 cents per 1,000. The discount period in Grand Rapids goes to the 15th day from first presentation of bill.

THE new plant of the Hannibal (Mo.) Citizens Gas Company was satisfactorily put in actual commission the 31st ult. The main extension into and through the extensions known as Indian Mound was put in service about the time the new plant was put at work, and the work on the South Side extension will be completed in a month. The growth of Hannibal is on the noticeable side, and its nature is of the solid, lasting sort.

THE East Moline section of the Tri-City Railway and Light Company's plant will be hooked up by the end of the month. The Company is also proposing to construct a suitable office structure, of the reinforced concrete type.

MR. W. K. BIXBY, President of the Laclede Gas Light Company, of St. Louis, Mo., was one of the ultimate purchasers at the recent sale in New York of the famous Hoe collection of books, paintings, etc. Through the services of Mr. Geerge D. Smith he secured the first book printing of Milton, the famous English poet. The price paid for this historic treasure was $2,000.

THE Connecticut Legislature has before it, through the presentation of minority and majority reports from the Judiciary Committee, the task of selecting an appropriate way of establishing a Public Utilities Commission. The second (or majority) report submitted recommends the creating of a Commission having jurisdiction and power similar to the like outlined under the existing statutes of New York and New Jersey. Such a Commission would take over the functions of the existing Railroad Commission, but with additional powers, giving the body power to wield authority over gas, electric light, telephone and water companies, and steam and electric railway companies as well. The minority bill differs in large respect from the former; that is, difference in detail. It is likely though, so well-informed men say, that both measures will be finally rejected.

MR. H. O. CHANNON, Manager of the Quincy (Ills.) Gas, Electric and Heating Company, which concern is a branch of the J. T. Lynn properties, acting on advices from the Lynn management, has formally notified the City Clerk of Quincy of the acceptance of the franchise ordinance granted the Company by the City Council, April 6th, 1911.

THE June "Bulletin," issued by the Western Gas Construction Company, has mainly to do with the Company's well-known standard form of valves, which has found such great favor in the producer plants of the U. S. Steel Corporation.

THE latest from the press division of the H. Mueller Manufacturing Company well shows, by means of text and cuts, its varied line of reducing and regulating valves. As the note which accompanied the example of the circular mailed us remarks, the Company has gone extensively into the business of valve making, and is now supplying regulators for all kinds of service, including gas, ammonia, oil, water, steam and air types. In connection with this division of its enterprise, the Company maintains a corps of experts respecting the regulating and governing of differing pressures, wherefore it is in a position to answer any question or to suggest a remedy to and for those confronted with pressure problems of an intricate nature.

ON June 5th eight residents along the line of Helen street, Binghampton, N. Y., filed a complaint with the Second District, N. Y. Public Service Commission, praying the local gas Company be required to extend its mains to their homes, in that said petitioners desire to light their houses and cook their food by means of gas fuel. To make such extension would require the placing of 963 linear feet of main. At the lowest estimate complainants aver that their consumption of gas would be not less than 2,000 cubic feet per month each, and as the cost of the extension would not exceed $500, the Company would be receiving a more than ample investment return. The Company refuses to make the extension, on the ground that the expense would be altogether out of proportion to the income return, especially in view of the fact that complainants do not bind themselves to take a minimum quantity of gas in any specified time. The Company's formal reply to the complaint should be in hand by Thursday next.

AN important decision was handed down, the 1st inst., by the New Jersey Board of Public Utility Commissioners, in respect of the application of the Atlantic Highlands Gas Company, for the right to lay pipes in the Red Bank district, which territory has been supplied by the Consolidated Gas Company, of Red Bank, for some time back. The Commissioners deny the application, b asing this refusal on the fact that competition along such lines is cer tainly ephemeral. One point of the decision, which is surely of great interest to all concerned in corporation matters, fairly gives the tenor of it all. It is this: "That public opinion has come to recognize the almost inevitable outcome of such temporary competition between public utilities is evidenced by much recent legislation. The creation of various boards and commissions, with supervisory power over public utilities, and often with eventual powers of rate-fixing, demonstrates that the illusive doctrine of competition in this field is being superseded by an experimental regime of strictly regulated momopoly."

ON the other hand, the Atlantic Highlands petitioners, in attempting to secure the right to enter Red Bank, alleged that the Consolidated Company's rate in Red Bank was excessive, giving that as an added reason why they should be granted the right. The Commissioners did not consider that allegation in their initial decision, but ordered that a separate hearing should be had in respect thereto, as per the following notification:

"*Whereas*, In the memorandum filed this day in a proceeding entitled 'In the matter of the application of the Atlantic Highlands Gas Company for the approval of an ordinance passed by the Township Committee of the township of Shrewsbury, county of Monmouth, State of New Jersey, November 17, 1910,' the Board of Public Utility Commissioners withheld its approval of said ordinance of the township of Shrewsbury granting to the Atlantic Highlands Gas Company certain rights on the grounds that the Consolidated Gas Company, of Red Bank, already had a franchise to serve said territory; and,

"*Whereas*, It appeared in said hearings, and also from the records of this Board, that the gross price now exacted for gas by the said Consolidated Gas Company, of Red Band, is $1.50 per 1,000 cubic feet.

"*Therefore*, The Board of Public Utility Commissioners, upon its own initiative, under the powers conferred on it by statute, hereby calls a hearing for the purpose of determining whether such rate is just and reasonable, and hereby fixes Tuesday, the 13th day of June, 1911, at 11 o'clock in the forenoon, at the State House, in the city of Trenton, as the time and place of said hearing, to the end that the Board of Public Utility Commissioners may, if, as the result of said hearing, it determines such rate to be unjust and unreasonable, fix a just and reasonable rate thereafter to be imposed, observed and followed by said Consolidated Gas Company, of Red Bank."

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

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ELBERT P. CALLENDER,
EDITORS.

CHARLES H. WADELTON,
MANAGER.

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MONDAY, JUNE 12, 1911.

The Market for Gas Securities.

The city gas share market was fairly strong for the time between quotations, the upward impulse having affected Consolidated and Brooklyn Union in like percentage. The former at noon to-day (Friday) was 147½ bid; the latter, 144½ to 145½. The Dow-Jones circular dated to-day, in Boston, contains noteworthy comparisons between the market values of Consolidated and Brooklyn Union and of Massachusetts gas. The lesson that the comparison plainly teaches is that if the latter values are properly based the former are vastly below their real worth. Blink the facts as one may, the actual value status of the New York city shares is in no sense reflected in the figures of transactions on the Exchange. This is particularly true of Brooklyn Union, the capitalization of which is well under $4 per 1,000 of output—$7 is from every point of view a fair capital per 1,000.

The general situation favors the investor, which is particularly so in respect of Peoples, of Chicago. Those competent to judge, say that in the end, the Hagenah report will be the basis for the selling schedule which will be arranged by the authorities. Lacledes show pronounced strength, and a like remark applies to Washington gas. United Gas Improvement Company's shares are stiffening, and this security acts as though 200 will be its portion in the near future.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

JUNE 12

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$78,177,000	100	147½	147¾
Central Union Gas Co.—1st 5's, due 1972, J. & J.	8,000,000	1,000	103	105
Equitable Gas Light Co.—Con. 5's, due 1932, M. & S.	1,000,000	1,000	115	118
Mutual Gas Co.	3,500,000	100	155	165
New Amsterdam Gas Co.—1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	100	101½
New York & Richmond Gas Co. (Staten Island)	1,500,000	100	35	50
1st Mtg. Gold Bds. 5 p. ct.	1,000,000	—	98½	100½
New York and East River—1st 5's, due 1944, J. & J.	3,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	95	100
Northern Union—1st 5's, due 1937, J. & J.	1,250,000	1,000	94	100
Standard	5,000,000	100	50	70
Preferred	5,000,000	100	70	100
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	103	105
The Brooklyn Union	15,000,000	1,000	144½	145½
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,650	500	130	—
Out-of-Town Companies.				
Bay State	50,000,000	50	½	⅝
" Income Bonds	2,000,000	1,000	—	75
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	500,000	1,000	95	100
Boston United Gas Co.—1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	50	60
Capital, Sacramento	500,000	50	—	85
Bonds (6's)	150,000	1,000	—	—
Chicago Gas Co. Guaranteed Gold Bonds	7,000,000	1,000	104	106½
Cincinnati Gas and Electric Co.	20,500,000	100	92	93
Columbus (O.) Gas Co., 1st Mortgage Bonds	1,500,000	1,000	96	98
Columbus (O.) Gas Lt. & Heating Co.	1,682,750	100	90¼	91
Preferred	3,026,500	100	75¼	80
Consumers, Toronto	2,000,000	50	200	204
Consolidated, Baltimore	11,000,000	100	106¼	—
Mortgages, 6's	3,600,000		89	100
Chesapeake, 1st 6's	1,000,000	—	—	—
Equitable, 1st 6's	910,000	—	—	—
Consolidated, 1st 5's	1,490,000	—	—	112
Consolidated Gas Co. of N. J.	1,000,000	100	15	—
Con. Mtg. 5's	976,000	1,000	92	95
Bonds	75,000	—	—	100
Denver Gas and Electric	3,500,000	—	102	105
Detroit City Gas Co.	6,580,000	—	—	50
" Prior Lien 5's	5,619,000	1,000	97	100½
Detroit Gas Co., 5's	381,000	1,000	75	80
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1,000	—	101
Essex and Hudson Gas Co.	6,500,000	—	39	40
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co., 1st Mtg. 5's	1,350,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of New Jersey	10,500,000	—	112	113½
" Bonds, 5's	10,500,000	—	108	108½
Indianapolis	2,000,000	—	78	83
" Bonds, 5's	2,650,000	—	104½	105
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co., of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	102	104
Laclede Gas Co., St. Louis.	10,000,000	100	107¼	107½
Preferred	2,500,000	100	94½	102
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,570,000	50	143	145
Madison Gas and Electric Co. " 1st Mtg. 6's	400,000	1,000	106	108¾
Massachusetts Gas Companies, of Boston	25,000,000	100	93	93¼
Preferred	25,000,000	100	97	97¾
Montreal Gas Co., Canada	2,000,000	100	218	218¾
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	56	58
Bonds, 6's	6,000,000	—	187	188
New Haven Gas Co.	2,000,000	25	200	—
Peoples Gas Lt. & Coke Co., Chicago	25,000,000	100	106¾	106½
1st Mortgage	20,100,000	1,000	—	—
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105½
San Francisco Gas Co., Cal.	15,500,000	—	—	—
St. Joseph Gas Co.—1st Mtg. 5's	1,000,000	1,000	100	102
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	108
Extension, 6's	600,000	1,000	112¾	115
General Mortgage, 5's	3,447,000	1,000	97	98
Syracuse Gas Co., N. Y.	1,975,000	100	50	55
Bonds	2,047,000	1,000	101	103
Washington (D. C.) Gas Co.	1,600,000	200	410	412½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	161	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, October 18, 19, 20, 21, 1911. St. Louis, Mo. Officers: President, Donald McDonald, Louisville, Ky. Secretary, A. B. Beadle, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting, June, 15, 16, 17, 1911. Quebec City, Quebec. Officers: President, Arthur Hewitt, Toronto, Ont.; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, Nov., 1911. New York City. Officers: President, C. R. Huntley, Buffalo, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Guild of Gas Managers of New England.—Annual meeting, March. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, time, March, Chicago, Ills. Officers: President, C. B. Strohn, Elgin, Ills.; Secretary-Treasurer, F. E. Newberry, Dixon, Ills.

Illuminating Engineering Society.—Annual meeting, Oct., Chicago, Ill., 1911. Meetings of Sections, monthly. Pres't, A. E. Kennelly, Boston, Mass.; Secretary, Preston S. Millar, 29 W. 39th street, N. Y. City.. Sections: New York: Secretary, Albert J. Marshall, 36 West 39th street. New England, Secretary, W. S. Farrow, 1290 Massachusetts avenue, Cambridge, Mass. Philadelphia, Secretary, G. B. Muth, 1000 Chestnut street Chicago, Secretary, F. H. Bernhard, Marquette Building.

Indiana Gas Association.—Annual meeting, Jan. 17 and 18, 1912, Indianapolis. Officers: President, S. E. Mulholland, Fort Wayne; Vice-President, Howard L. Olds, Indianapolis; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, time, May, ——, 1912; Clinton, Ia, Officers: President, Austin Burt, Waterloo, Ia.; Secretary and Treasurer, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, time, ———— Wichita, Kas. Officers: President, W. A. Scothorn, Hutchinson, Kas.; Secretary and Treasurer, J. D. Nicholson, Newton, Kas.

Michigan Gas Association—Annual meeting, time, Sept. 20, 21, 22, 1911; Detroit, Mich. Officers: President, A. P. Ewing, Detroit, Mich.; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1912; St. Louis, Mo. Officers: President, F. E. Murray, Louisiana, Mo.; Secretary and Treasurer, N. J. Cunningham, Springfield, Mo.

National Commercial Gas Association.—Annual meeting, October 23-28, 1911. Denver, Officers: President, C. N. Stannard, Denver; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, ———————; Pittsburgh, Pa. Officers: President, John M. Garard, Columbus, O. Secretary, T. C. Jones, Delaware, O. Editor Wrinkle Department, F. W. Stone, Ashtabula, O.

New England Gas Association.—Annual meeting, third Wednesday in February, 1912; Boston. Officers: President, J. A. Coffin, Gloucester, Mass.; Secretary-Treasurer, N.W. Gifford, East Boston, Mass.

Ohio Gas Association —President, John M. Garard, Columbus, O.; Secretary-Treasurer T. C. Jones, Delaware, O.

Pacific Coast Gas Association.—Annual meeting, Sept. 20, 21 and 22, 1911, Oakland, Cal. Officers: President, F. A. Leach, Jr., Oakland, Cal.; Vice President, W. Baurhyte, Los Angeles, Cal.; Secretary-Treasurer, John A. Britton, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, April, 1912, Williamsport, Pa. Officers President, C. W. Butterworth, Millon, Pa; Secretary-Treasurer, William H. Merritt, Lebanon, Pa.

Society of Gas Lighting.—Annual meeting, December, 1911; monthly meeting, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 254 West 39th street, New York city.

Southern Gas Association.—Annual meeting, April, 1912, Jacksonville, Fla. Officers: President, H. B. Hoyt, Jacksonville, Fla.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting. April 27, 28, 29, 1911; Houston, Tex. Officers: President, W. B. Tuttle, San Antonio, Tex.; Secretary, D. G. Fisher, Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May 15 and 16, 1912, Milwaukee, Wis. Officers: President, H. M. Buck, Waukesha, Wis.; Secretary-Treasurer, Henry Harmon, Milwaukee, Wis.

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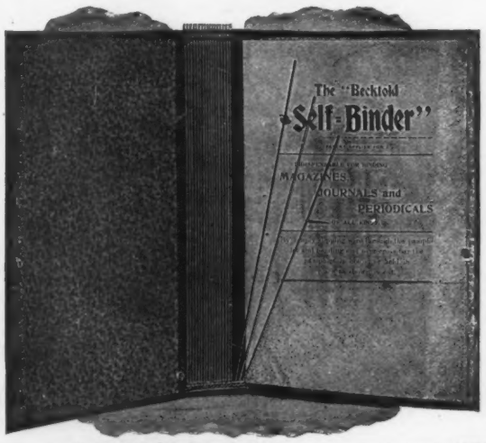

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See Oil.

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Isbell-Porter Co.
Kerr Murray Mfg Co
Roots Co., P. H. & F. M.

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Didier-March Co.
Evens & Howard Firebrick Co.
Gardner, Jr. Co., James.
Gas Machinery Co.
Gautier & Co., J. H.
Laclede-Christy Clay Products Co.
Maurer & Son, H.
Missouri Firebrick Co.
Parker-Russell Mining & Mfg. Co.

Fittings.
See Pipe.

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American Gas Furnace Co.

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American Meter Co.
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Helme & McIlhenny.
McDonald & Co., D.

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Chapin-Fulton Mfg. Co.
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Isbell-Porter Co
Lloyd Construction Co.
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Pittsburgh Meter Co.
Reynolds Gas Regulator Co.

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See Ranges.
Water Heaters.

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See Furnaces.

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Morris Iron Co.
Sun Street Light Co.
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Connelly Iron Sponge & Governor Co.
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See Charging Machinery.
Coal Gas Apparatus.
Conveyors.
Water Gas Apparatus.

Mains.
Sullivan Bros.
See Also Pipe.

Mantles.
American Gas Light Co.
General Gas Light Co.
Welsbach Co.

Meters—Acetylene.
Keystone Meter Co.

Meters—Air.
Metric Metal Works.
United Gas Improvement Co.

Meter Connections.
Mueller Mfg. Co., H.

Meter Locks.
See Prepayment Meters.

Meters—Natural Gas
Keystone Meter Co.
Metric Metal Works.
Pittsburg Meter Co.
Standard Meter Co.
Sprague Meter Co.

Meters—Prepayment.
American Meter Co.
Dickey & Co., C. H.
Griffin & Co., John J.
Helme & McIlhenny.
Keystone Meter Co.
McDonald & Co., D.
New York Improved Meter Co.
Sprague Meter Co.
Tufts Meter Co., N.

Meters—Proportional.
Metric Metal Works.
Pittsburg Meter Co.
Rotary Meter Co.

Meter Provers.
See Provers.

Meters—Regular.
American Meter Co.
Dickey & Co., C. H.
Griffin & Co., John J.
Helme & McIlhenny.
Keystone Meter Co.
Metric Metal Works.
McDonald & Co.
New York Improved Meter Co.
Pittsburg Meter Co.
Standard Meter Co.
Sprague Meter Co.
Tufts Meter Co., N.

Meters—Station.
American Meter Co.
Dickey & Co., C. H.
Griffin & Co., John J.
Helme & McIlhenny.
McDonald & Co., D.
Rotary Meter Co.
Standard Meter Co.
Tufts Meter Co., N.

Meters—Steam.
Gas Machinery Co.
United Gas Improvement Co.
Western Gas Construction Co.

Meters—Test.
American Meter Co.
Dickey & Co., O. H.
Standard Meter Co.

Meters—Water.
Pittsburg Meter Co.

Meters—Wet.
American Meter Co.
Helme & Mellhenny.
Tufts Meter Co., N.

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Standard Oil Co.

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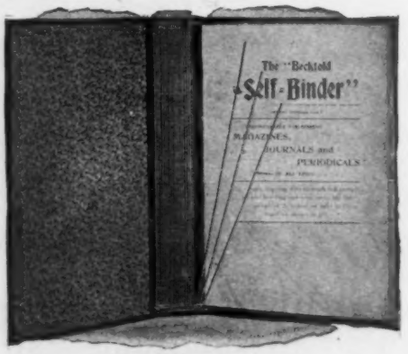

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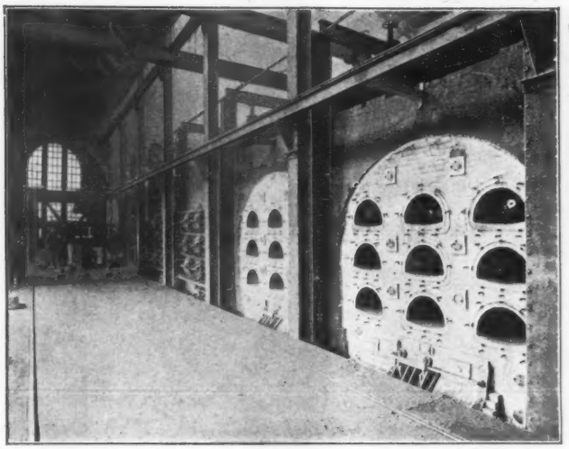

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[COMMUNICATED BY THE AMERICAN METER COMPANY.]

Day of Week.	MOONLIGHT SCHEDULE.		
	Date.	Light.	Extinguish.
Thursday	1	11.00 P.M.	3.30 A.M.
Friday	2	11.30	3.30
Saturday	3	12.00 F.Q.	3.30
Sunday	4	12.20 A.M.	3.30
Monday	5	12.50	3.30
Tuesday	6	1.10	3.30
Wednesday	7	1.30	3.30
Thursday	8	2.00	3.30
Friday	9	2.20	3.30
Saturday	10	No L.	No L.
Sunday	11	No L. F.M.	No L.
Monday	12	No L.	No L.
Tuesday	13	8.00 P.M.	10.30 P.M.
Wednesday	14	8.00	11.10
Thursday	15	8.00	11.50
Friday	16	8.00	12.20 A.M.
Saturday	17	8.00	12.40
Sunday	18	8.00	1.10
Monday	19	8.00 L.Q.	1.30
Tuesday	20	8.00	1.50
Wednesday	21	8.00	2.20
Thursday	22	8.00	2.50
Friday	23	8.00	3.30
Saturday	24	8.00	3.30
Sunday	25	8.00	3.30
Monday	26	8.00 N.M.	3.30
Tuesday	27	8.00	3.30
Wednesday	28	8.00	3.30
Thursday	29	8.00	3.30
Friday	30	8.00	3.30

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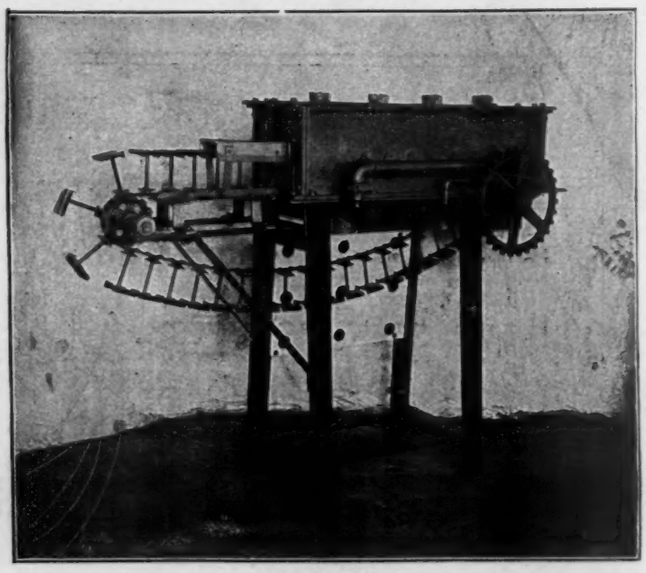

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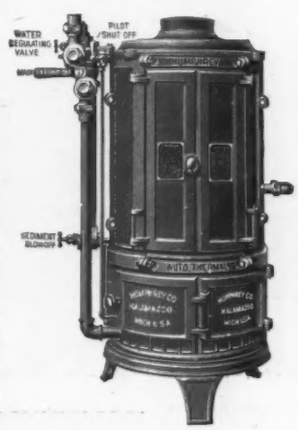

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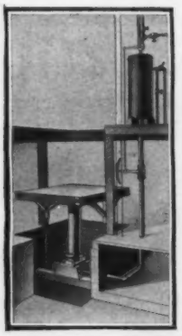

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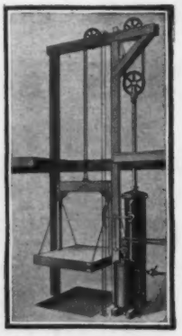
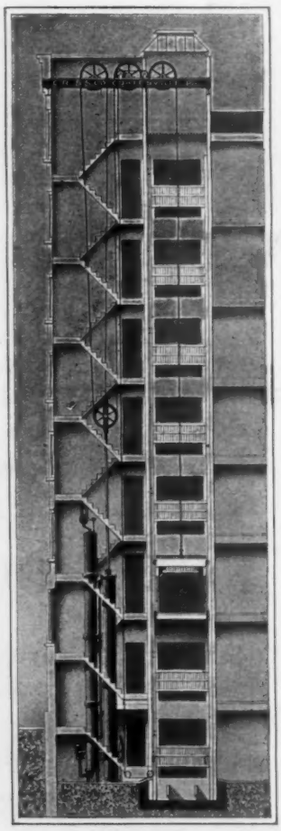
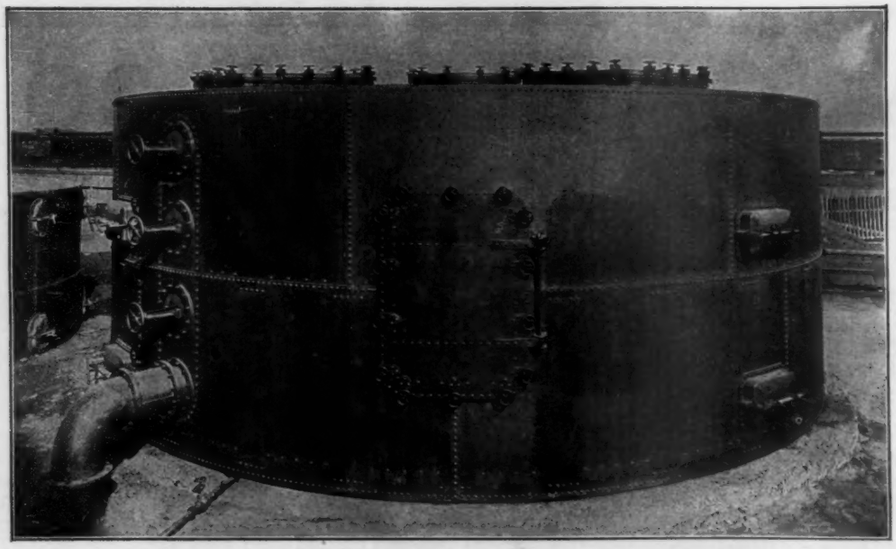




PURIFIERS.



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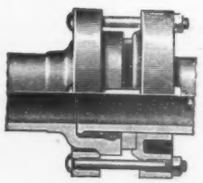
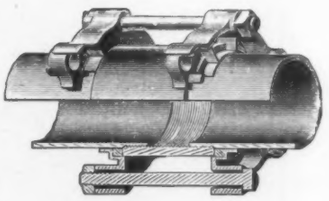


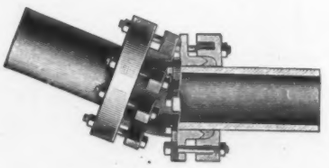
Clamp for Bell and Spigot Joints.

Style 4½.



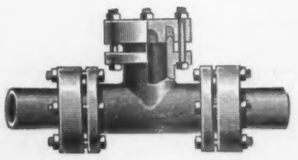
Clamp for Screw Collar.

Style 4.



Angle Couplings.

Style 28.



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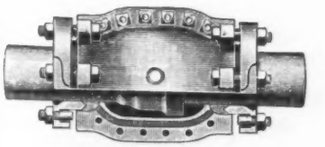
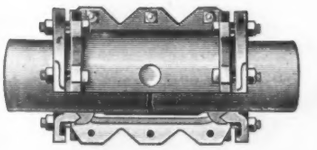


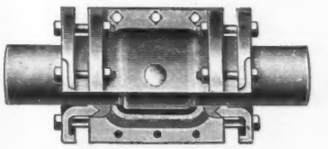
Heavy Split Sleeve for Cast Iron Pipe.

Style 26.



Light Split Sleeve for Cast Iron Pipe.

Style 27.



Light Split Sleeve for Wrought Iron Pipe.

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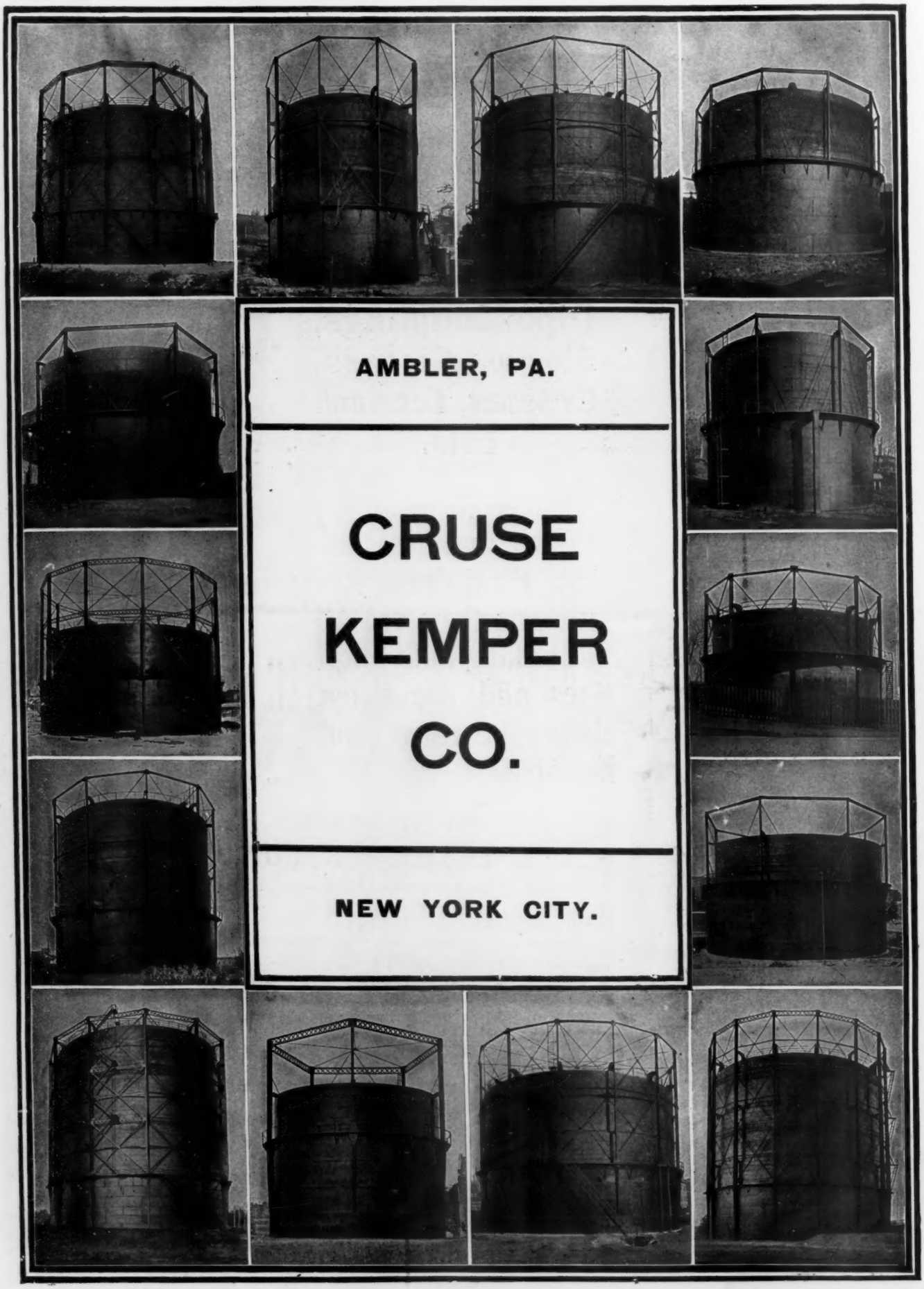
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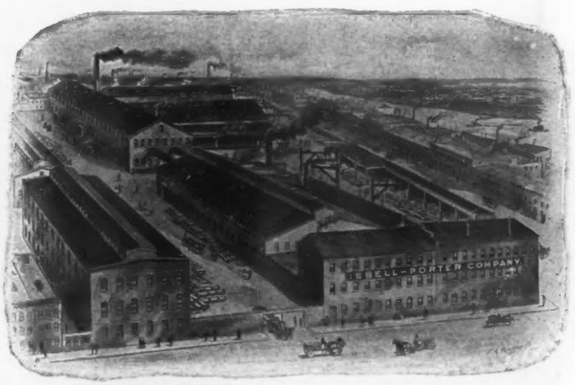

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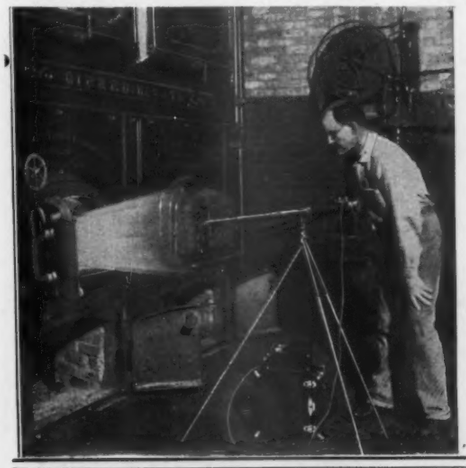

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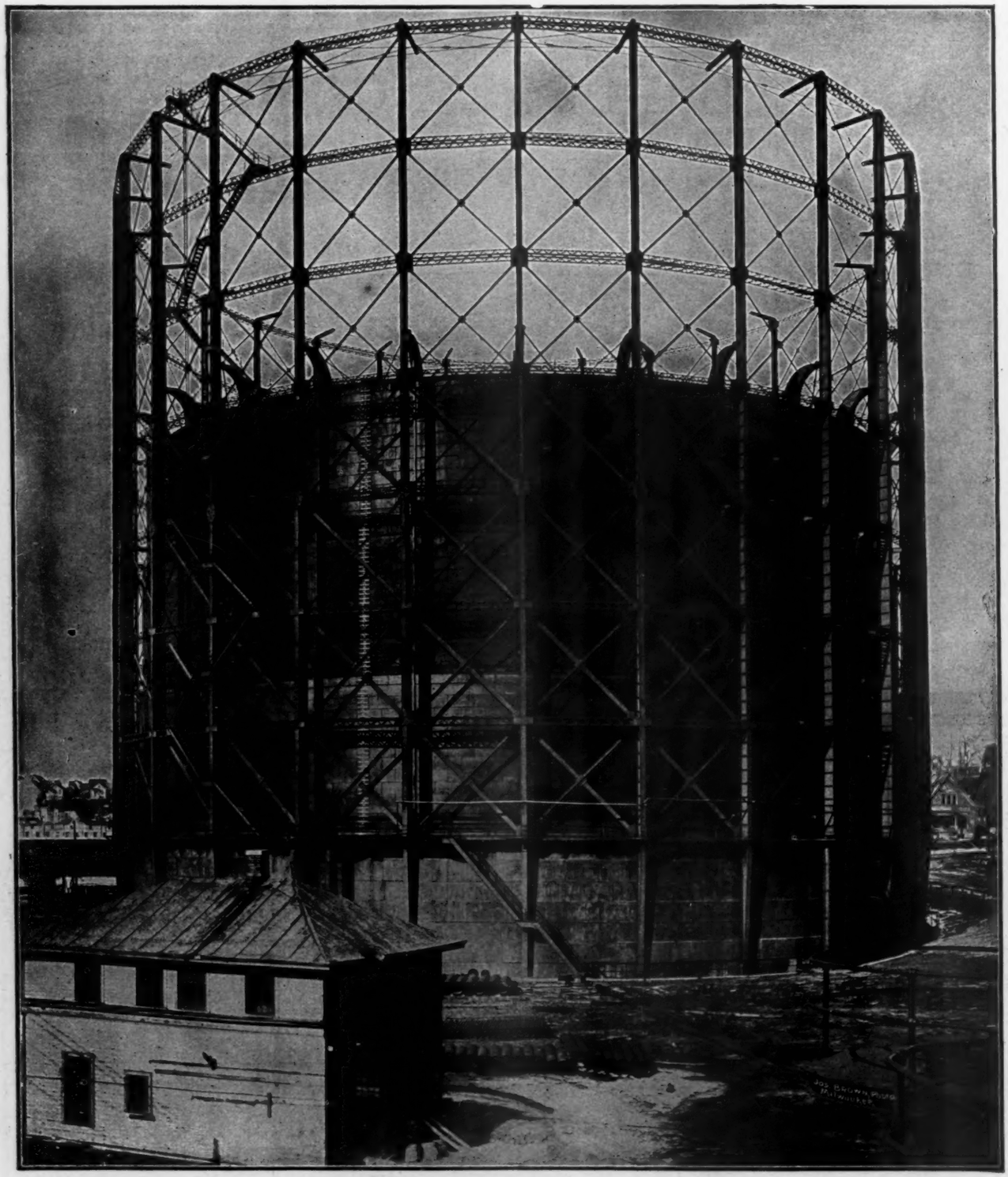

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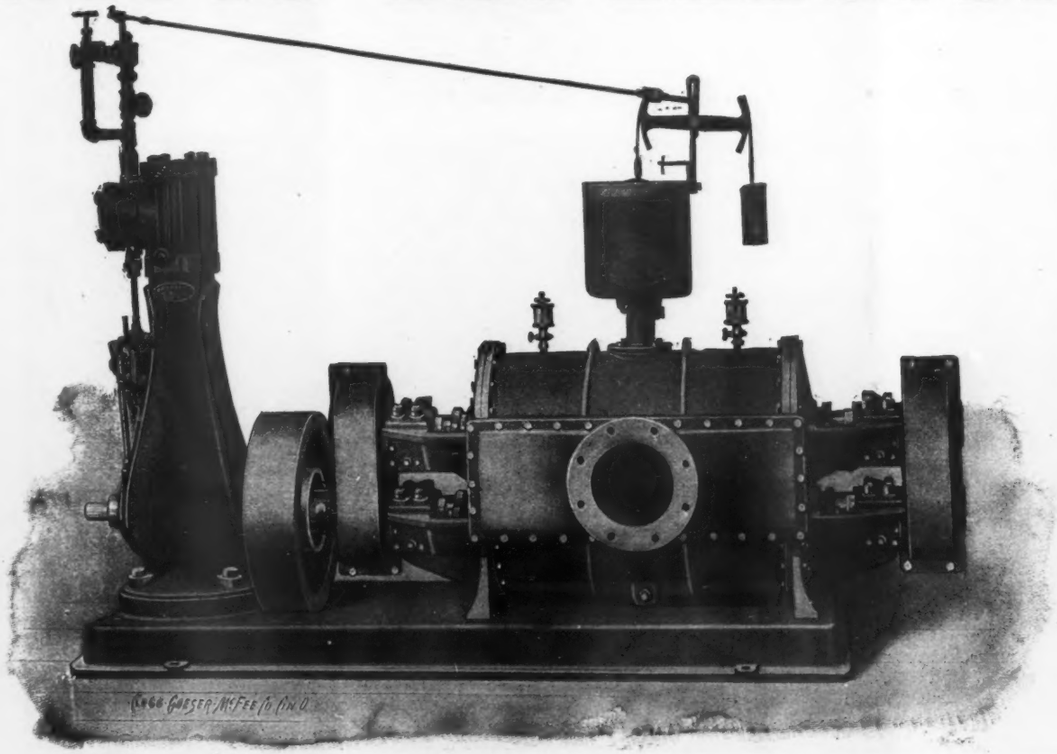

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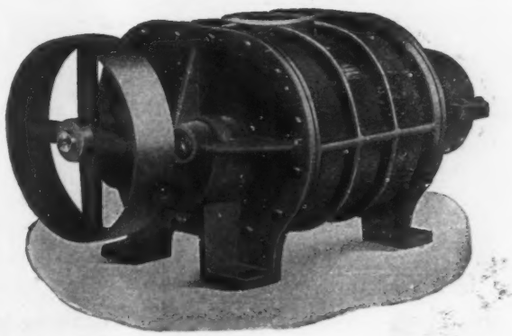

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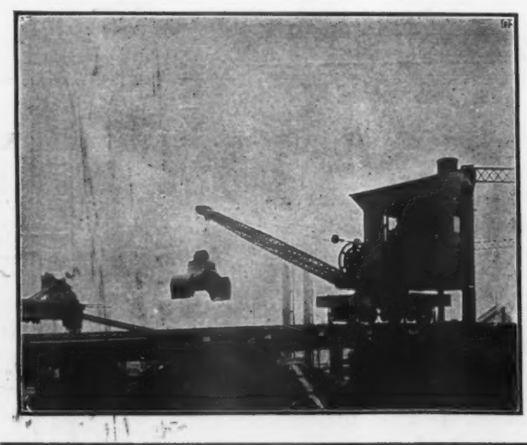

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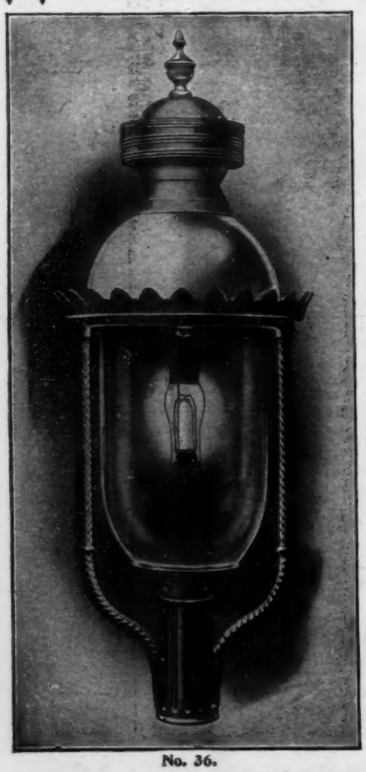

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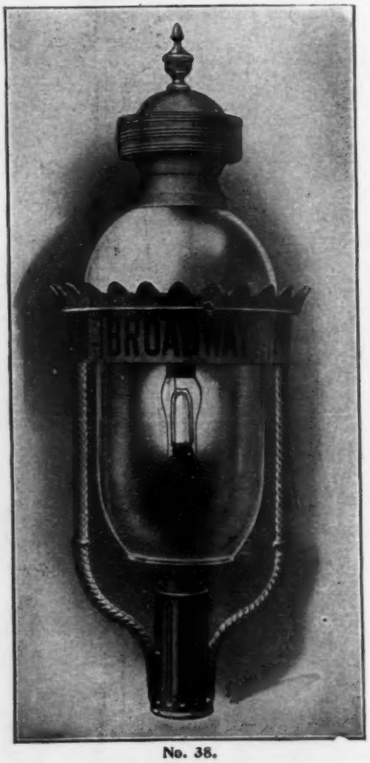

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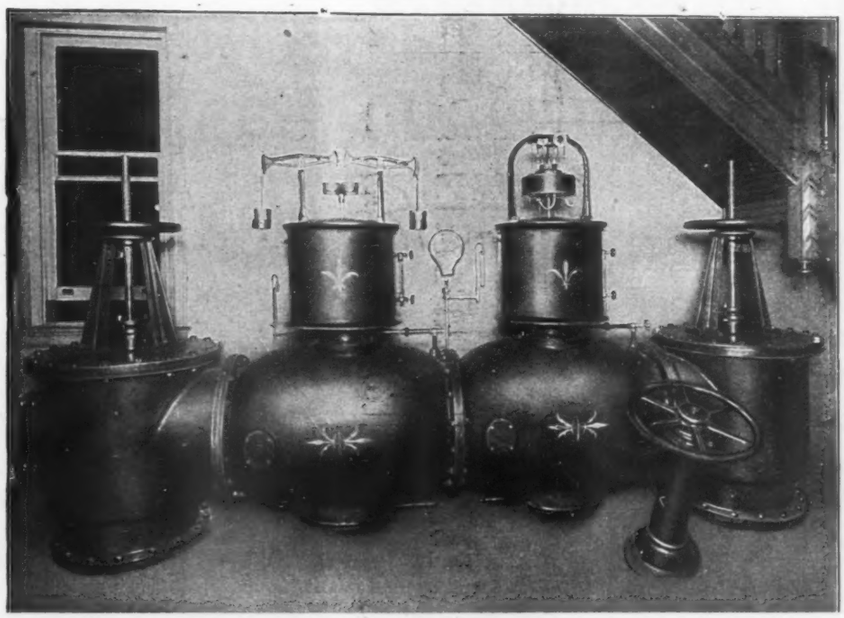

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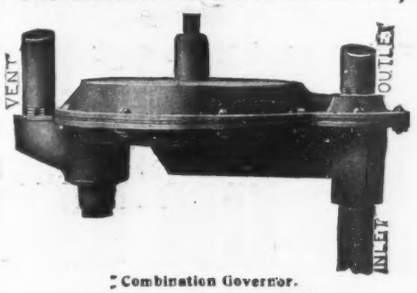

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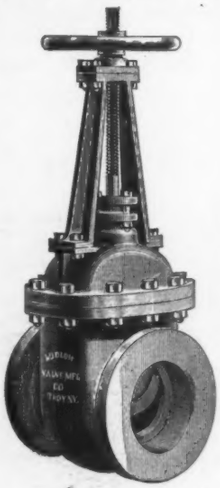

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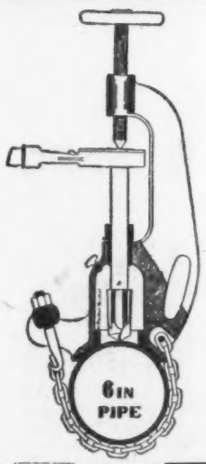

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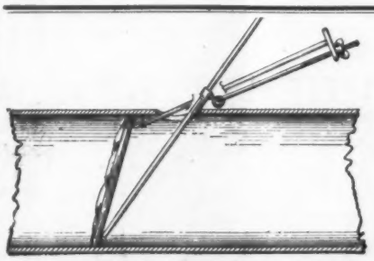

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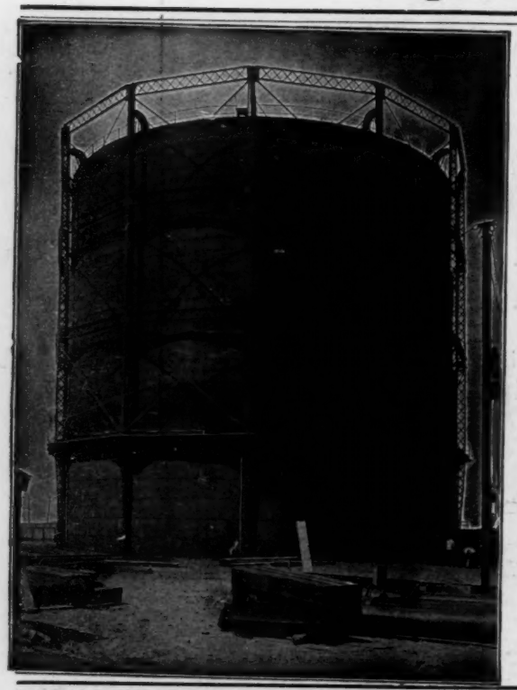

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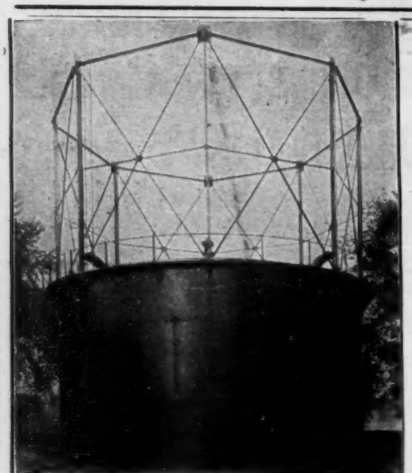

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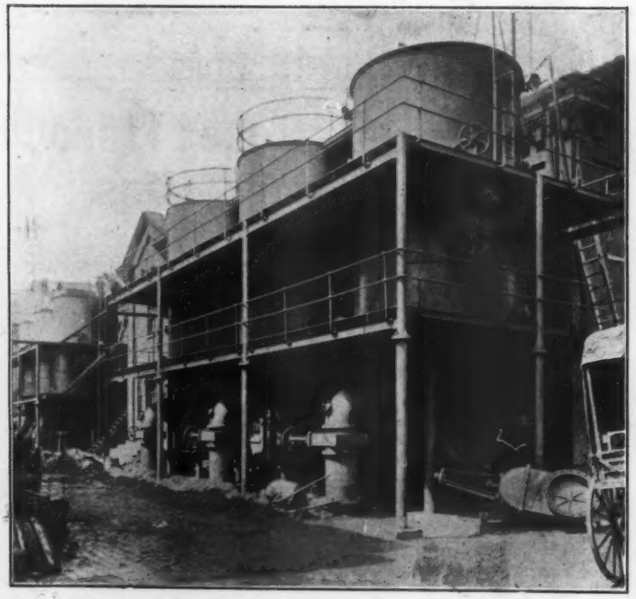

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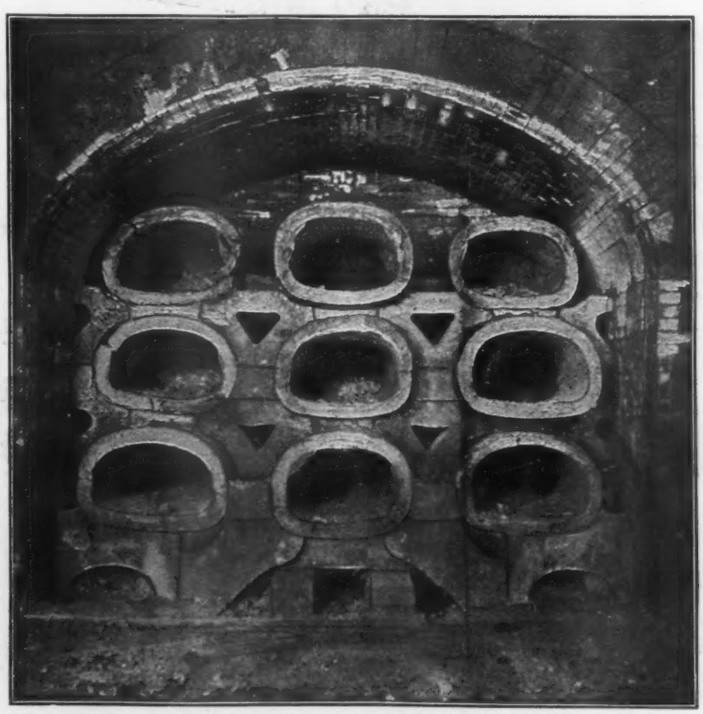

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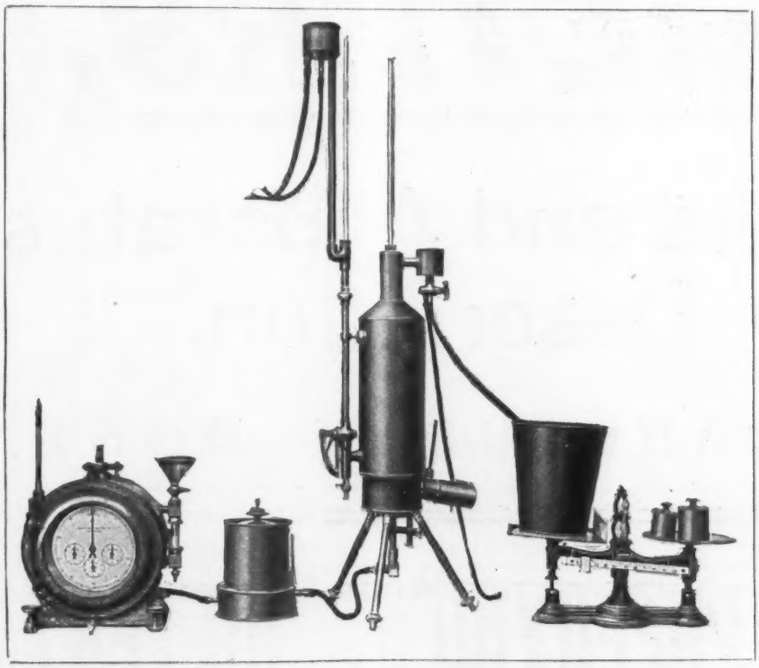

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